

Final
Five-Year ROD Review Report
First Five-Year Review Report for
Allegany Ballistic Laboratory
Superfund Site
Rocket Center, West Virginia



Prepared for
Department of the Navy
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia

Contract No. N62470-95-D-6007
CTO-0110

June 2002

Prepared by

CH2MHILL

Baker
Environmental, Inc.

CDM
Federal Programs Corp.

7/10/02 - 01831

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Contract Task Order 0110

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This report documents completion of the 5-year review for Allegany Ballistics Laboratory Superfund Site, specifically the Site 5 Landfill Contents and Surface Soil, Operable Unit 1, and a status summary of additional sites, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in accordance with CERCLA §121(c), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR).

United States Department of the Navy

By:



Date:

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M. H. CONAWAY
CAPTAIN, CEC, USN
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Executive Summary

This is the first 5-year review conducted for Allegany Ballistics Laboratory (ABL). The review was initiated by the remedial action initiation date for Site 5 Operable Unit 1 (OU-1; landfill contents and surface soil), the first Operable Unit at Allegany Ballistics Laboratory for which a Record of Decision (ROD) was signed. The review was conducted between October 16, 2001, and February 13, 2002, in accordance with the U.S. Environmental Protection Agency guidance document entitled *Comprehensive Five-Year Review Guidance* (July 17, 2001). The remedy for OU-1 prevents direct contact with landfill waste and contaminated soil and reduces infiltration of precipitation through the landfill and subsequent degradation of groundwater beneath the landfill. A ROD for the second operable unit at the site will be completed in the future for groundwater, surface water, and sediment.

On the basis of the findings of document and data review, site inspections, and interviews conducted during this 5-year review, the Site 5 OU-1 remedy is functioning as intended by the ROD for Site 5 landfill contents and surface soil that was signed in February 1997. There have been no changes in the physical condition of the landfill cap since its construction that would affect the protectiveness of the remedy for OU-1. Nor were there any substantial changes in applicable relevant and appropriate or other regulatory standards considered that were identified during the 5-year review that would affect the protectiveness of the remedy. Further, it is not believed that any change in standard risk assessment methodology would affect the remedy protectiveness. Nor has any additional information been identified during this review that calls into question the protectiveness of the remedy.

An update to this 5-Year ROD Review Report will be completed at the next trigger date, which is for Site 1 groundwater, in June 2003. That update will include a comprehensive review of the status of all sites at ABL. Forthcoming 5-Year ROD Review Reports will be completed on a 5-year schedule starting with the current report (i.e., June 2007, June 2012, etc.).

Five-Year Review Summary Form		
SITE IDENTIFICATION		
Site name (from CERCLIS): Allegany Ballistics Laboratory		
EPA ID (from CERCLIS): WV0170023691		
Region: 3	State: WV	City/County: Rocket Center/Mineral
SITE STATUS		
NPL Status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify):		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Construction completion date: 10/02/1997
Has site been put into reuse? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
REVIEW STATUS		
Lead agency: <input type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input checked="" type="checkbox"/> Other Federal Agency: Department of the Navy		
Author: Naval Facilities Engineering Command, Atlantic Division with support from the CLEAN II contractor CH2M HILL, Inc.		
Review period: October 16, 2001 through February 13, 2002		
Date(s) of site inspection: October 16, 2001 and February 12, 2002		
Type of review: <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Policy		
<input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify):		
Triggering action: <input checked="" type="checkbox"/> Actual RA Onsite Construction <input type="checkbox"/> Actual RA Start <input type="checkbox"/> Construction Completion <input type="checkbox"/> Recommendation of Previous 5-Year Review Report <input type="checkbox"/> Other (specify):		
Triggering action date (from CERCLIS): 07/10/1997		
Due date (five years after triggering action date): 07/10/2002		

Five-Year Review Summary Form (continued)**Issues:**

Five issues were identified:

- Need for administrative documentation of land use controls (LUCIP)
- Slope instability on the hillside above Drainage Channel 4
- Need for improved documentation of repairs/maintenance activities
- Need for updated Site 5 O&M and Long-Term Monitoring plans
- Elevated methane levels in landfill gas monitoring well 5LGMW04. Continued increases in methane concentrations from 5LGMW04 may result in an exceedance of the WVDEP limits for methane emissions and may cause an explosive hazard at the site.

Recommendations and Follow-Up Actions:

Several actions are recommended to address the issues and ensure that protectiveness is maintained:

- Prepare and implement a LUCIP for Site 5
- Monitor slope creep of the hillside above Drainage Channel 4 and make any necessary repairs
- Initiate and maintain a permanent compilation of all future repairs and corrective actions performed as part of O&M
- Update the Site 5 O&M and Long-Term Monitoring Plans to reflect current procedures
- Undertake a study to evaluate the extent of the methane gas and to determine whether corrective action is warranted

Protectiveness Statement(s):

The remedy at Site 5 OU-1 is protective of human health and the environment with respect to potential contact with landfill waste and contaminated soil. To ensure long-term protectiveness in the future, a LUCIP for Site 5 will be developed and implemented. In addition, the extent of methane gas buildup adjacent to the cap will be evaluated and corrective action implemented, if necessary.

Other Comments:

None

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Acronyms and Abbreviations

ABL	Allegany Ballistics Laboratory
amsl	above mean sea level
ARAR	Applicable or Relevant and Appropriate Requirement
ATK	ATK Tactical Systems, LLC
bgs	below ground surface
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund)
CFR	Code of Federal Regulations
COPC	chemical of potential concern
DCE	dichloroethylene
DNAPL	dense non-aqueous phase liquid
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
FMC	flexible membrane cap
GCL	geosynthetic clay layer
GOCO	government-owned, contractor-operated
gpm	gallons per minute
HHRA	human health risk assessment
IRP	Installation Restoration Program
LANTDIV	Atlantic Division, Naval Facilities Engineering Command
LNAPL	light non-aqueous phase liquid
LUCIP	Land-Use Control Implementation Plan
MC	methylene chloride
MCL	Maximum Contaminant Level
NAVSEA	Naval Sea Systems Command
Navy	Department of Navy
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NFA	No Further Action
NPL	National Priorities List
O&M	Operations & Maintenance
OHM	OHM Remediation Services, Inc
OMI	Operation Management International, Inc.
OU	Operable Unit

PAH	polycyclic aromatic hydrocarbon
PRG	preliminary remediation goal
RA	remedial action
RAB	Restoration Advisory Board
RAC	remedial action contractor
RAO	Remedial Action Objectives
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOC	Semivolatile Organic Compound
SWQC	West Virginia Specific Water Quality Criterion
TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene
TCL	Target Compound List
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
WVDEP	West Virginia Department of Environmental Protection
XRF	X-ray fluorescence

1 Introduction

The purpose of a 5-year review is to determine whether the selected remedy at a site is or is expected to be protective of human health and the environment. The methods, findings, and conclusions of the review are documented in a Five-Year Review Report. In addition, a Five-Year Review Report identifies issues found during the review, if any, and makes recommendations to address them.

The Department of Navy (Navy) is preparing this 5-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with Section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The United States Environmental Protection Agency (USEPA) interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

On behalf of the Naval Facility Engineering Command (NAVFACENGCOM), Atlantic Division (LANTDIV), CH2M HILL has conducted this 5-year review of the remedial action implemented for Site 5 Landfill Contents and Surface Soil, known as Operable Unit (OU)-1, at the Allegany Ballistics Laboratory (ABL) Superfund site in Rocket Center, West Virginia. The review was conducted between October 16, 2001, and February 13, 2002, in accordance with the USEPA *Comprehensive Five-Year Review Guidance* (July 17, 2001), and this report documents the results of the review.

This is the first 5-year review for OU-1. The triggering action for this statutory review was the initiation of the remedial action (landfill cap installation) on July 10, 1997. The 5-year review is required because hazardous substances, pollutants, or contaminants remain at the site above levels that would allow for unlimited use and unrestricted exposure.

The remedy for OU-1, a composite landfill cap with a geosynthetic clay liner (GCL) and flexible membrane cap (FMC), was designed to prevent direct contact with landfill wastes, to reduce infiltration of precipitation through the landfill and subsequent degradation of groundwater beneath the landfill, and to improve control of leachate. Contaminated

groundwater at Site 5 has been defined as OU-2. The nature and extent of groundwater contamination and the potential human health and environmental risks posed by these contaminants are currently being addressed in a focused remedial investigation/feasibility study (RI/FS). Remedy selection for OU-2 is anticipated in 2003.

This report is divided into 11 sections and seven appendices. Section 2 provides a chronology of historic activities that involved Site 5. Section 3 provides background information on Site 5, including its physical characteristics, historic waste disposal activities, identified contamination, and the basis for implementing a remedy. Section 3 also includes a brief summary of the status of the other Installation Restoration Program (IRP) sites at ABL. Section 4 discusses the remedy selected for Site 5 OU-1 and the ongoing O&M procedures. Section 5 is set aside to discuss progress made since the last 5-year review. Section 6 discusses the current 5-year record-of-decision (ROD) review process. Section 7 presents the technical assessment made during the 5-year review of whether the remedy is protective of human health and the environment. Section 8 lists any issues identified during the review process and Section 9 presents the recommendations to address the issues. Section 10 provides a summary statement regarding the protectiveness of the remedy, based on the 5-year review findings. Section 11 defines when the next 5-year review is required.

Appendix 1 contains the figures referenced in this report. Appendix 2 is a copy of the deed notation for Site 5. Appendix 3 is a compilation of all of the landfill inspection reports. Appendix 4 lists all of the documents reviewed during the 5-year review process. Appendix 5 lists the Applicable or Relevant and Appropriate Requirements (ARARs) for Site 5 OU-1. Appendix 6 presents summary tables for all of the long-term monitoring program data for Site 5. Appendix 7 presents the 5-year review site inspection photographic log. Appendix 8 provides the 5-year ROD Review Report Inspection Checklist. Appendix 9 provides a transcript of the public meeting held on February 13, 2002.

2 Site Chronology

A summary of significant events for OU-1 is presented in Table 2-1.

TABLE 2-1
Chronology of Site Events

Date	Event
1982	Initial Assessment Study (IAS) (ESE, January 1983)
1984–1987	Confirmation Study (CS)/Interim Remedial Investigation (Interim RI) (Weston, October 1989)
1992	Remedial Investigation (RI) (CH2M Hill, January 1996)
June 1993	ABL proposed for listing on NPL
May 31, 1994	Final listing of ABL on NPL
1994	Phase II Remedial Investigation (Phase II RI) (CH2M HILL, August 1996)
September 19, 1995	Federal Facilities Agreement signed
1996	Focused Feasibility Study (FFS) for Site 5 Landfill Contents and Surface Soil (CH2M HILL, August 1996)
February 12, 1997	ROD selecting the remedy for Site 5 Landfill Contents and Surface Soil (OU-1) is signed
March 1997	Remedial Design complete (CH2M HILL, March 1997)
July 10, 1997	Landfill cap construction initiated (statutory review triggering action)
October 2, 1997	Landfill cap construction completed
November 1997	Draft Contractor Closeout Report submitted (OHM, November 1997)
August 25, 1999	Deed notation filed with Mineral County
May 1998–present	Long-term groundwater, surface water, and sediment monitoring (CH2M HILL, May 2000)

3 Background

ABL is located in Rocket Center, Mineral County, in the northeastern part of West Virginia, approximately 10 miles southwest of Cumberland, Maryland along the West Virginia and Maryland border (Figure 1). The facility lies between the North Branch Potomac River, to the north and west, and Knobly Mountain, to the south and east. Several small towns are located near the facility, including Short Gap, West Virginia, to the southeast and Pinto, Maryland, to the north.

ABL consists of about 1,634 acres of land with about 350 buildings. The facility is divided into two distinct operating plants (Figure 1):

- Plant 1, which occupies about 1,577 acres (including a large undeveloped area), is a government-owned, contractor-operated (GOCO) facility. The plant is leased to its operator, ATK Tactical Systems, LLC (ATK), by the owner, the Naval Sea Systems Command (NAVSEA), through a Facilities Use Contract. Approximately 400 acres of Plant 1 (the majority of the developed portion of ABL) are in the floodplain of the North Branch Potomac River where the river has cut into the base of Knobly Mountain. Of the 11 present and former Installation Restoration Program sites at ABL, 8 are or were located within the developed area of Plant 1 and 3 are within the undeveloped area. On May 31, 1994, Plant 1 was added to the National Priorities List (NPL).
- Plant 2, which occupies the remaining 57 acres, is both owned and operated by ATK. Plant 2 is not on the NPL.

3.1 Physical Characteristics of the Site

Site 5 is located about 1,000 feet south of Plant 2, in the undeveloped portion of Plant 1 on a terrace adjacent to the North Branch Potomac River (Figure 2). The site is approximately 4 acres and ranges from 680 to 704 feet above mean sea level (amsl). It is bounded on the west by the North Branch Potomac River and on the east by Knobly Mountain.

The land directly across the North Branch Potomac River from Site 5 in Maryland is rural farmland; however, there are several small businesses and residences within about 6,000 feet west of the site. The nearest communities, Cresaptown and Bel Air, Maryland, had a combined population of approximately 10,850 persons as of the 1990 Census.

Immediately northeast of Site 5 there is an active construction debris landfill. Within 1,000 feet south of the Site 5 landfill there is a small building used for storage, and directly east of Site 5 is a facility road leading to Magazine Road and the undeveloped portion of Plant 1. Five bedrock groundwater production wells, which are located approximately 2,000 feet southeast of Site 5 along Magazine Road, supply potable water to ABL. Natural springs are located near the wells. A commercial limestone quarry is located about 3,000 feet south of Site 5.

3.2 Land and Resource Use of the Site

The Site 5 Inert Landfill operated from the early 1960s to 1985, accepting wastes generated by ABL and deemed to be inert. Inert wastes were defined as wastes not contaminated with explosives nor generated in an area on the facility where explosives were managed. Wastes reported to have been disposed of at Site 5 include drums that previously contained trichloroethene (TCE), methylene chloride (MC), and acetone; fluorescent tubes (a potential mercury source); unknown laboratory and photographic chemicals; fiberglass and other resin-coated fibers; metal and plastic machining wastes; and construction and demolition debris. Prior to implementation of the remedial action, the landfill was covered with a 1- to 2-foot layer of crushed limestone and some metal drums were visible along the western toe of the landfill.

The Site 5 landfill has been inactive since 1985. Although the site is still considered part of the industrial facility, no human activity currently takes place there, with the exception of periodic operation and maintenance (O&M) activities associated with the landfill cap and the long-term monitoring program. There are signs posted on the east, west, north, and south sides of the landfill stating that the property is government-owned and that trespassing is not permitted. In addition, a deed notation has been filed with Mineral County that further limits land use at Site 5. A copy of the deed notation is presented in Appendix 2.

Groundwater in both the alluvial and bedrock aquifers beneath the site is not used as a drinking water source, but is believed to discharge to the adjacent North Branch Potomac River. Access to this reach of the river is not restricted and it could be used for recreational purposes, such as swimming and fishing.

No significant change to the status of Site 5 is anticipated in the future. However, additional land use controls are expected to be implemented in the form of soil and groundwater use control maps that will be located in the facility planning and onsite NAVSEA techrep offices. In addition, a remedial action is anticipated to be implemented for Site 5 groundwater, surface water, and sediment (OU-2) in 2003, which will include a control on groundwater use.

3.3 History of Contamination

As noted above, the Site 5 landfill received inert wastes from the 1960s to 1985. These wastes are believed to have included potential contaminant sources, such as drums that formerly contained solvents. During the Phase II RI, a geophysical survey was conducted at Site 5 that identified buried metal structures within the landfill. Soil gas samples collected above these structures confirmed the presence of the same volatile organic compounds (VOCs) that had been detected in groundwater at the site. Therefore, it is believed that waste material historically disposed in the inert landfill is the source of contamination detected in Site 5 media.

Although semivolatile organic compounds (SVOCs) and metals have been detected in Site 5 media, VOCs have been shown to be the primary contaminant type found at the site. VOCs were found in soil samples collected around the toe of the landfill, but all detected concen-

trations were below the instrument quantitation limits. Groundwater sampling has also identified an alluvial aquifer VOC plume migrating from the landfill northwest toward the North Branch Potomac River. TCE, the most prevalent VOC, has been detected in groundwater at the site at concentrations up to about 100 µg/l. VOCs have also been detected in the bedrock aquifer, but to a much lower extent and concentrations.

3.4 Initial Response

No pre-ROD cleanup activities were conducted at Site 5. Disposal activities at the landfill ceased in 1985. At that time, the majority of the landfill debris was covered with a 1- to 2-foot layer of crushed limestone. The landfill remained in this condition until the remedial action activities were initiated in July 1997.

3.5 Basis for Taking Action

As noted in Section 3.3, VOCs are the most prevalent contaminant type detected in Site 5 media (principally groundwater). Using all of the data collected to date (including non-VOC data), risk assessments were conducted during the Phase II RI. Although Site 5 is and will continue to be an industrial facility with little human activity, a baseline human health risk assessment (HHRA) was conducted to evaluate a number of exposure scenarios deemed possible. Risk estimates were calculated for potential current on-site workers and potential future residential receptors exposed to surface soil and groundwater through ingestion, dermal contact, and inhalation, and for potential future construction workers exposed to surface soil through ingestion, dermal contact, and inhalation. Because the remedial action for OU-1 was for landfill contents and surface soil, only risks estimated for exposure to soil are summarized below:

Potential Current Onsite Workers—The cumulative noncancer hazard indices for ingestion of and dermal contact with surface soil at Site 5 were calculated to be less than 1, which is the USEPA's threshold value for assessing whether adverse health effects are likely to occur. The cumulative ingestion and dermal contact cancer risk was 6×10^{-6} , well within USEPA's target risk range of 1×10^{-4} and 1×10^{-6} .

Potential Future Construction Worker—The cumulative noncancer hazard index and cancer risk from exposure via inhalation of volatiles and fugitive dust, and ingestion of and dermal contact with Site 5 surface soil, were calculated to be 0.3 and 1×10^{-6} , respectively.

Potential Future Residents—The cumulative noncancer hazard index and cancer risk associated with future residential exposure to surface soil at Site 5 were calculated to be 0.9 and 6×10^{-5} , respectively.

The results of the ecological risk assessment (ERA) indicated that for an initial screening of chronic effects, organic and inorganic contaminants were detected at levels exceeding standard levels using very conservative Biological Technical Assistance Group (BTAG) criteria. These exceedances represented a potential risk to aquatic and terrestrial resources. The ERA determined that the results from surface water and sediment samples did not indicate the presence of contamination from Site 5. However, surface water and sediment will be evaluated further as part of OU-2. The results of the ERA indicated that certain

SVOC and mercury levels in the soil at Site 5 represented a low potential risk to ecological resources and that chromium and lead levels in soil posed a high potential ecological risk.

Although the potential risks to human health from exposure to Site 5 soil were determined to be within acceptable limits, it was determined that a remedial action for the Site 5 soil and landfill contents was necessary in order to reduce any possible exposure to contaminants in and on the landfill and to reduce infiltration of precipitation. It was believed that by reducing precipitation infiltration, leaching of contaminants from the landfill waste to the groundwater would be minimized or eliminated. By reducing leachate migration to groundwater, it was believed that the existing groundwater contaminant concentrations, some of which exceeded the USEPA's maximum contaminant levels (MCLs), would decline.

3.6 Status of Other Installation Restoration Program Sites at ABL

This section summarizes the current remedial action status of the other IRP sites at ABL. The approximate location of each of the eight IRP sites is shown in Figure 1. As shown in the figure, six of the eight sites are located within the 400-acre developed area of Plant 1 (i.e., sites 1, 2, 3, 4B, 10, and 11), while sites 5 and 7 are located in the largely undeveloped area to the south. Site 5 is not discussed in this section.

Site 1: Northern Riverside Waste Disposal Area

Site 1 is an 11-acre area that consists of several disposal units, including an active 8-acre, fenced burning ground for ordnance; three inactive disposal pits for spent solvents and acids; a former drum storage area for drums containing hazardous wastes; a former landfill for ash; and a former burning area for inert substances. The three disposal pits have been backfilled, all drums have been removed from the drum storage area, and both the ash landfill and the inert burning ground are overgrown with vegetation. Site 1 is located in the northern portion of Plant 1 adjacent to the North Branch Potomac River, as shown in Figure 1.

Site 1 was part of a number of investigations conducted at ABL in the 1980s and early 1990s during which VOCs (specifically TCE, 1,2-dichloroethylene [1,2-DCE], 1,1,1-trichloroethane [1,1,1-TCA], MC, and acetone) were found to be the most widespread constituents of potential concern (COPCs) detected in soil, alluvial and bedrock groundwater, and surface water and sediment of the adjacent North Branch Potomac River. Based upon risks identified for Site 1 media during the Focused RI, an FFS for Site 1 groundwater was completed in September 1996.

The Navy issued a PRAP for groundwater, surface water, and sediment in October 1996 and signed the ROD in May 1997. The selected remedy for Site 1 groundwater and the surface water and sediment of the North Branch Potomac River adjacent to Site 1 was sitewide alluvial and bedrock groundwater containment (i.e., capture and removal) with subsequent onsite treatment and discharge of treated water to the river and/or the facility's steam generation plant.

In order to evaluate the hydraulic properties of the alluvial and bedrock aquifers at Site 1 and to determine the optimal number, configuration, and withdrawal rates of extraction

wells, Phase I Aquifer Testing, Phase II Aquifer Testing, and Phase III Aquifer Testing were conducted in 1995, 1996, and 2001, respectively.

Construction of a groundwater treatment facility to remove hazardous constituents from the extracted groundwater at Site 1 began in September 1997. Continuous work on the construction of the Site 1 treatment system began in March 1998. The treatment plant began continuous operation in September 1998 and has treated an average of more than 100 gallons per minute (gpm) of groundwater extracted from Site 1 since that time. Currently, treated groundwater is utilized by the ABL steam generation plant, with excess water being discharged to the river. Monthly monitoring of the water levels, the influent, and effluent concentrations from the treatment plant have continued since the system has been in operation. The data generated by these monitoring activities are provided to the State and USEPA. Soil data at Site 1 were collected during the RI, Focused RI, and 1998 and 2001 supplemental soil sampling efforts to delineate areas of contamination and identify COPCs. The data from the supplemental investigations currently is being used to revise the human health and ecological risk assessments for Site 1 soil in accordance with the most recent USEPA guidance. It is anticipated that the risk assessments and preliminary remediation goals (PRGs) for Site 1 soil will be completed in 2002. An FS for Site 1 soil is anticipated for 2003.

Site 2: Previous Burning Ground (1942-1949)

Site 2 was an ordnance burning ground reportedly utilized from 1942 to 1949 in a manner similar to the Site 1 ordnance burning ground. Based upon aerial photographs, the former burn pad area is suspected to be southeast of Building 361, as shown in Figure 1. In addition, a solvent storage shed was identified near Building 100 during the RI. Past sampling events at Site 2 have targeted both of these areas. The amount of wastes disposed of at the site cannot be determined due to the lack of historical records about past disposal practices.

Several investigations (i.e., IAS, CS/Interim RI, RI, and Phase II RI) have been performed to evaluate the nature and extent of contamination in environmental media at Site 2. Generally, low estimated concentrations of only a few VOCs (i.e., TCE, 1,1-DCE, carbon disulfide, and xylenes) and SVOCs (mostly polycyclic aromatic hydrocarbons [PAHs]) were detected in the soil at Site 2. Several inorganic constituents (i.e., mercury, nickel, aluminum, arsenic, manganese, and silver) were identified as COPCs for Site 2 in the risk assessments conducted during the Phase II RI (CH2M HILL, August 1996). Existing data suggest Site 2 does not pose a significant risk to human health or the environment. However, data gaps were identified, so supplementary surface and subsurface soil sampling activities were conducted in October 2001 to revise the human health and ecological risk assessments for the site. The risk assessments are estimated to be completed in mid-2002. Following revision of the risk assessments, an FS for Site 2 will be prepared.

Site 3: Previous Burning Ground (1950-1958)

Similar to Site 2, Site 3 was an ordnance burning ground reportedly utilized from 1950 to 1958. Two areas of disturbed soil and four linear features at the approximate location of current southern end of Building 362 were identified in aerial photographs. The location of Site 3 is shown in Figure 1. In addition, an attached solvent storage shed was identified on

the west-end of Building 151 during the RI. Past sampling events at Site 3 have targeted these areas. The quantities of wastes that were disposed of in this area cannot be determined due to a lack of historical records about past disposal practices.

Several investigations (i.e., IAS, CS/Interim RI, RI, and Phase II RI) have been performed to evaluate the nature and extent of contamination in environmental media at Site 3. VOCs (i.e., TCE, MC, cis-1,2-DCE, 1,2-DCE [total], and acetone) were detected in a sample collected just south of the solvent storage shed at much higher concentrations than elsewhere at Site 3. Generally, low estimated concentrations of only a few VOCs were detected in all other samples collected at Site 3. Bis(2-ethylhexyl phthalate), a common laboratory contaminant, was the only SVOC detected in the soil at Site 3. No COPCs were identified for Site 3 surface soil. Two organic constituents (i.e., 1,2-DCE [total] and TCE) and three inorganic constituents (i.e., arsenic, barium, and manganese) were identified as COPCs for Site 3 media in the human health risk assessment conducted during the Phase II RI (CH2M HILL, August 1996). Existing data suggest Site 3 does not pose a significant risk to human health or the environment. However, like Site 2, data gaps were identified, so supplementary surface and subsurface soil sampling activities were conducted in October 2001 to revise the human health and ecological risk assessments for the site. The risk assessments are estimated to be completed in mid- 2002. Following revision of the risk assessments, an FS for Site 3 will be prepared.

Site 4B: Spent X-Ray Developing Solutions Disposal Site

Site 4B, the Spent Photographic Developing Solution Site, is also located in the southeastern portion of Plant 1, approximately 3,000 feet from the North Branch Potomac River (Figure 1). The site is composed of the area adjacent to the southeast corner of Building 181 where spent photographic solutions (containing silver, cyanide, and phenols) were reportedly discharged through a fire hose, into a concrete drainage channel, and then underground into a terra cotta/steel pipe that extends from the end of the concrete drainage channel to an open stormwater drainage ditch in an adjacent grassed area. Elevated concentrations of silver were observed in surface soil samples collected at Site 4B during the Confirmation Study. Additional soil sampling was performed at the site during the Phase II RI where the concrete drainage channel enters the terra cotta/steel pipe and in the adjacent drainage ditch. Elevated levels of silver were again detected, in addition to low levels of several VOCs and SVOCs. The risk assessment performed using data gathered during the Phase II RI and previous investigations suggest that silver concentrations in soil may pose a risk to human health and the environment.

Additional soil sampling was conducted at Site 4B in June 2000 to evaluate the potential impacts to soil due to the discharge of spent photographic solutions from Building 181 and to provide sufficient data to determine if concentrations of silver (the primary COPC) or any other inorganic constituents at the site pose a risk to human health and the environment.

The results of the risk assessments have been used to determine PRGs for soil contamination at Site 4B. A soil removal action pilot study using X-ray fluorescence (XRF) technology is planned for the summer of 2002. The purpose of the pilot study is to evaluate whether XRF can be used to guide soil removal for the particular COPCs at Site 4B.

Site 7: Former Beryllium Landfill

In the early 1960s, ABL requested and obtained a permit from the State of West Virginia (Permit 3324) to establish a landfill for beryllium waste disposal. ABL was conducting research on propellants containing beryllium and required disposal facilities for both beryllium-containing propellants and elemental beryllium. A small (10 feet by 15 feet by 6 feet deep) earthen pit was excavated to the limestone bedrock, which was used intermittently in the 1960s to dispose of beryllium and beryllium-contaminated waste. The former beryllium landfill is located outside of Plant 1, as shown in Figure 1. The research with beryllium at ABL ceased in the late 1960s.

Records documenting the material disposed of at the landfill (Site 7) were not kept and identification of material disposed of was based on conversations with facility personnel who were present at the time the site was active. The following information was gathered from these personnel:

- No beryllium-containing propellant was landfilled.
- Beryllium-containing wastes included wiping tissues, gloves, emptied containers, and respirator cartridges which might have been contaminated with metallic beryllium or beryllium oxide.
- The total quantity of waste disposed of in the landfill was considered “small” because the landfill was approximately 150 square feet and 6 feet deep. Waste was placed in the pit and covered with a few shovels of dirt.
- A small quantity of laboratory chemicals also was placed in the landfill; however, no personnel were able to provide information as to the specific chemicals or chemical types.

Site 7 was evaluated during a number of investigations. The Interim RI and the RI found only relatively low levels of inorganic constituents in soil and groundwater at the site. In June 1994, the material from Site 7 was excavated and placed into steel storage containers. The results from the Interim RI were used initially to characterize the waste as non-hazardous. The excavation and backfilling of the Site 7 landfill was completed on June 30, 1994. In 1997, the excavated soil was shipped offsite for disposal.

A Streamlined RI/FS report was prepared for Site 7 in 2001 to document the history of investigation and remedial action activities, the nature and extent of contamination, potential risks to human health and the environment from site media, and evaluate potential remedial alternatives for the site.

A No Further Action (NFA) ROD was signed for Site 7 in September 2001. Because no contamination remained onsite at the time of the ROD, there is no statutory requirement to perform 5-Year ROD Reviews for this site.

Site 10: Former TCE Still at Building 157

Site 10 consists of the area around Building 157 and is located within the developed portion of Plant 1, as shown in Figure 1. In order to be consistent with other numbered IRP sites at ABL, Site PWA was renamed Site 10 in 1995. Site PWA had been defined and investigated during the CS, RI, and Phase II RI because contamination had been detected in production

well "A" (PWA), which was used in the past to supply potable, boiler, and fire-fighting water to the plant. Because VOCs were detected in the well as early as 1980, PWA's use as a water source was discontinued. It is now believed that contamination in PWA originated, at least in part, from the former TCE still that operated adjacent to Building 157 during 1959 and the early-1960s.

Site 10 (also Site PWA) was part of a number of investigations conducted at ABL in the 1980s and early 1990s and a supplemental soil investigation conducted in July 2000. Information gathered these investigations indicated that limited VOC soil contamination exists in the vicinity of the former TCE still but that a VOC plume (specifically TCE) is present in both the alluvial and bedrock aquifers at Site 10. Based upon the risks identified for Site 10 groundwater during the Phase II RI, an FFS for Site 10 groundwater was completed in March 1998.

The Navy issued the PRAP for groundwater at Site 10 in March 1998 and signed an interim action ROD in August 1998. The selected remedy, which was a modification of one of the alternatives listed in the FFS, was considered an interim action because it did not address the full extent of alluvial and bedrock aquifer contamination. The interim action was intended to contain and remove the most highly contaminated portion of the alluvial aquifer (i.e., TCE contamination greater than 100 µg/l) before further downgradient migration could occur while other remedial actions (e.g., monitored natural attenuation) were considered for the less contaminated portion of the aquifers.

As noted above, a treatment facility was designed and constructed to remove hazardous constituents from the extracted groundwater at Site 1. The treatment plant began continuous operation in September 1998. Implementation of the interim remedial action at Site 10 (i.e., installation of three groundwater extraction wells) was completed in February 1999, at which time groundwater extraction at Site 10 with subsequent treatment at the Site 1 treatment plant began.

After several months of groundwater monitoring at Site 10, it became evident that the existing extraction-well configuration was capturing all but the most northeastern portion of the alluvial-aquifer TCE plume and that the installation of one additional alluvial extraction well might achieve complete plume capture. A direct-push groundwater investigation was performed in June 2000 to further delineate the northeastern extent of the alluvial-aquifer TCE plume and determine the best location for installation of an additional alluvial extraction well. To achieve capture of the alluvial groundwater VOC contamination above MCLs at Site 10, a fourth alluvial extraction well was installed in the suspected northeastern tip of the TCE plume in July 2000. A monitoring well was also installed at the downgradient edge of the alluvial aquifer contaminant plume to verify hydraulic containment.

Initially, the hydraulic head data at Site 10 indicated bedrock groundwater had a tendency to flow upward into the alluvial aquifer. The interim action attempted to take advantage of this condition by pumping only the alluvial aquifer at Site 10. However, hydraulic head data gathered prior to and following extraction system startup at Site 1 indicated that the vertical hydraulic gradient between the alluvium and bedrock at Site 10 has reversed (i.e., became downward) potentially under the influence of bedrock groundwater extraction at Site 1. To

test this hypothesis and to evaluate the need for bedrock extraction at Site 10, an aquifer test was performed in July 2001.

The results of aquifer testing and modeling performed during Phase III Aquifer Testing indicate that bedrock groundwater extraction at Site 1 is limiting the effectiveness of the alluvial extraction wells at Site 10 from capturing the bedrock contamination. The groundwater model was used to evaluate the most effective way of overcoming the influence of groundwater pumping at Site 1 and determined that the addition of four bedrock extraction wells at Site 10 would result in all groundwater contamination being contained at Site 10. These changes to the extraction system were proposed as the final proposed remedial alternative for Site 10 groundwater in a November 2001 PRAP. It is anticipated that the ROD will be signed in mid-2002 and that the final remedial action will be implemented by the end of the same year.

Additional soil sampling was conducted at Site 10 in June 2000 to further delineate the extent of soil contamination associated with the former TCE still. Soil data collected at Site 10 during the RI, Phase II RI, and June 2000 soil sampling event are currently being evaluated to determine the potential ecological and human health risk posed by the site. The risk assessments and a Focused FS will be completed for Site 10 soil in mid-2002.

Site 11: Production Well “F” (F-Well)

The historical significance of Site 11 is the former existence of a boiler house (Building 215), fuel oil storage area, and a deep bedrock production well known as F-Well (Figure 1). The original boiler house, built in the late 1950s, was approximately 1,000 square feet and housed a single boiler unit. In 1961, F-Well was installed adjacent to Building 215 to provide potable water to Plant 1 as well as to the boiler housed in Building 215. Following its installation, attempts to develop F-Well were unsuccessful due to sand flowing into the well through fractures in the bedrock. Because the sand prevented pump operation in the well, F-Well was never put into production. However, it also was never properly abandoned. In 1962, an addition was added to the boiler house that doubled its size and number of boilers. During this expansion, F-Well was covered by the building addition's foundation.

In 1995, an Advanced Site Inspection (ASI) was conducted to characterize potential groundwater and soil contamination in and around F-Well and a former oil pit at the construction site for Building 421, the existing building adjacent to F-Well (CH2M HILL, February 1996). The ASI identified a limited area of soil contamination and an area of alluvial and bedrock groundwater contamination. Furthermore, a light, non-aqueous phase liquid (LNAPL) and a DNAPL were detected in F-Well.

Based on the findings of the ASI, a RI was initiated at Site 11 in June 1998 to delineate the nature and extent of contamination in the soil and alluvial and bedrock aquifers in the vicinity of F-Well. It is believed that while over-drilling F-well during the RI that the LNAPL and DNAPL were removed. Based on this, quarterly sampling was initiated prior to preparation of the RI report. The fourth round of quarterly sampling was completed in February 2001. Human health and ecological risk assessments are currently being prepared and will be documented in the RI report. The Site 11 RI is anticipated to be completed in mid-2002.

4 Remedial Actions

4.1 Remedy Selection

The remedial action selected for the Site 5 landfill contents and surface soil (OU-1) is the first planned for the two OUs at the site. The remedy for OU-1 was designed to reduce potential exposure risks and to reduce contaminant leaching from the landfill and degradation of groundwater beneath. OU-2 is defined as contaminated groundwater, surface water, and sediment at the site and will be addressed in a future decision document.

The ROD for Site 5 OU-1 was signed on February 12, 1997. Remedial Action Objectives (RAOs) were developed during the FFS to assist in the development and screening of remedial alternatives to be considered for the ROD. The RAOs, determined by the USEPA, West Virginia Department of Environmental Protection (WVDEP), and Navy, were to:

- Prevent or minimize infiltration and any resulting leaching of contaminants from the landfill into the groundwater;
- Prevent or minimize direct-contact of human and ecological receptors with landfill contents; and
- Prevent surface water run-on and control surface water runoff erosion.

To achieve these RAOs, the selected remedy for OU-1 included the following major components:

- Administrative documentation of land use controls;
- Installation of a GCL and FMC;
- Re-vegetation of the capped area;
- Construction of a landfill gas collection system;
- Groundwater and sediment monitoring; and
- Postclosure O&M.

Specific performance standards for the cap discussed in the ROD consist of the following:

- Vegetative support layer containing sufficient organic materials and nutrients to sustain vegetative cover with a minimum thickness of 24 inches.
- Drainage layer with hydraulic conductivity greater than 10^{-2} cm/s.
- Composite barrier layer consisting of a GCL overlain by a 40-ml FMC with a maximum hydraulic conductivity of 10^{-7} cm/s.
- Side slopes not to exceed 4 (horizontal):1 (vertical).
- Vegetative stabilization with perennial species within 45 days of placement of the final cover.

4.2 Remedy Implementation

The remedial design for Site 5 OU-1 was completed in March 1997. The design engineer of record for this project was CH2M HILL, Inc. OHM Remediation Services Corporation (OHM) was the Remedial Action Contractor (RAC) contracted by the Navy to furnish and install an almost 2-acre multilayer cap over Site 5 OU-1.

The remedial action (RA) at the site began with mobilization on July 10, 1997. The major components of the RA were:

- Site and landfill preparation including clearing and grubbing of grass and wooded vegetation in and around the work area and rough grading of the landfill to achieve the initial design shape of the landfill for capping;
- Installation of erosion and sedimentation controls, including the perimeter trench and stormwater diversion ditches, silt fences, and straw check dams;
- Installation of a landfill gas collection trench, a gas conveyance pipe, and gas vents at each end of the trench;
- Installation of the landfill cap including a GCL on top of a 1-foot clay grading layer followed by a geomembrane and composite drainage net; and
- Installation of an 18-inch-thick clay protective layer above the composite drainage net to protect the synthetic layer, followed by topsoil to support vegetative growth, and site restoration that included reseeding the landfill cap surface.

Field activities related to landfill cap construction were completed with demobilization on October 2, 1997.

4.3 System Operation/Operation and Maintenance

The Navy retains the responsibility for overseeing the administrative and substantive requirements of the Final Postclosure O&M Plan for Site 5 (CH2M HILL, March 1998). All official correspondence with the USEPA and WVDEP, including submissions of reports, is generated through LANTDIV. LANTDIV contracted with OHM (October 1997 through September 1999) and CH2M HILL (October 1999 to present) to perform O&M activities for Site 5 OU-1. The work is being conducted in general accordance with the approved O&M plan. O&M for the site consists of routine inspections of the landfill cover and general site conditions, maintenance (e.g., mowing), and repairs. An inspection form is filled out each time an inspection is performed and is presented to the USEPA and WVDEP via the ABL Partnering Team website. A copy of each monthly landfill inspection report is presented in Appendix 3.

On a monthly basis, a general site inspection is performed that comprises the following activities:

- The landfill cover is inspected for abnormalities such as depressions, bulging, erosion, surface cracking, and stressed vegetation;

- Groundwater monitoring wells are inspected to ensure the protective casings are in good condition and the well caps are present, and locks are present and operational;
- Landfill gas monitoring wells are inspected to ensure they are in good condition, and locks are present and operational;
- The roadside security fencing is visually inspected for forced entry, destruction from fallen trees, operation and integrity of locks and gates, and overall condition of the fence;
- Warning signs are inspected to ensure that they are clearly visible and in good condition;
- The stormwater outfall and perimeter drainage channels are inspected to ensure that they are free of blockages; and
- The outfall to the river is inspected for excessive sediment and silt build up.

In addition to the monthly general site inspection, landfill-gas production is evaluated on a quarterly basis. A copy of each quarterly landfill-gas monitoring report is presented in Appendix 3. This evaluation is performed as follows:

- The concentration of VOCs (including methane) and the rate of VOC emissions from the landfill gas vents are measured; and
- The concentration of methane in the landfill gas monitoring wells are measured.

Finally, collection and analysis of stormwater runoff samples from the landfill is conducted on a quarterly basis, when stormwater flow occurs at the outfall, to ensure no leachate is being produced and seeping from beneath the landfill cap. Continued leaching of contaminants from the landfill also is evaluated via a long-term groundwater sampling program. The program currently involves sampling groundwater at the site and sediment and surface water from the adjacent reach of the North Branch Potomac River on a tri-quarterly basis (i.e., every 9 months).

Typical O&M costs include the monthly general and quarterly detailed inspections, landfill gas monitoring, and long-term monitoring. O&M costs for Site 5 are considerably higher than the original estimate of \$24,000 annually, likely due to higher long-term monitoring costs (i.e., higher number of wells sampled) than were anticipated.

Table 4-1 (below) presents annual O&M costs to date for the site. The O&M costs for 1997 reflect the fact that O&M activities were performed for only 3 months and did not include any long-term monitoring events. Nonstandard O&M costs represented in Table 4-1 include access road repair work conducted in 2000, installation of automatic samplers to collect stormwater runoff samples in 2001, and an enhanced landfill gas monitoring program in 2001.

TABLE 4-1
Estimated Annual O&M Costs (including long-term monitoring)

Year	Total Cost (Rounded to the Nearest \$500)
1997 (3 months)	\$1,100
1998	\$73,000
1999	\$64,000
2000	\$69,500
2001	\$74,000

4.4 Summary of Modifications to Long-Term Monitoring Program and O&M Procedures

4.4.1 Long-Term Monitoring Program Modifications

Groundwater Sampling

According to the Long-term Monitoring Plan for Site 5 (CH2M HILL, March 1998), 13 monitoring wells were selected for the long-term monitoring program. The plan called for full Appendix IX analyses for 7 of the 13 wells and Target Compound List (TCL) VOCs and Target Analyte List (TAL) total and dissolved metals for the remaining six wells (in addition to a suite of wet chemistry parameters) on a quarterly basis. The wet chemistry parameters include alkalinity, ammonia (reported as nitrogen), bicarbonate, biochemical oxygen demand (BOD), chemical oxygen demand (COD), chloride, nitrate, pH, sulfate, total dissolved solids (TDS), total organic carbon (TOC), and total phenols. However, because there were no SVOCs, pesticides, PCBs, herbicides, or explosives detected in Site 5 groundwater samples collected during the initial long-term monitoring event (May 1998), the Partnering Team concurred on discontinuing Appendix IX analyses in favor of TCL VOCs and total and dissolved metals analyses. In addition, low concentration (LC) VOC analysis was substituted for TCL VOC analysis at the inception of the long-term monitoring program in order to achieve lower detection limits.

Because the Partnering Team concurred that the frequency of the long-term monitoring events could be reduced without sacrificing the ability to perform an ongoing assessment of the remedy protectiveness, the frequency of long-term monitoring was changed from quarterly to tri-quarterly (i.e., every 9 months) starting in January 1999. At the same time, nitrite and hardness were added to the list of wet chemistry parameters to better assess groundwater conditions.

Six new alluvial monitoring wells (i.e., wells 5GW19 through 5GW24) were added at Site 5 during the Focused RI conducted in 2000 to assist with delineating the contaminant plume extent and evaluating natural attenuation processes. Beginning with the August 2000 sampling event, these six wells were incorporated into the long-term monitoring program. In addition,

methane, ethane, and ethene analyses were added to the long-term monitoring program to assist with the continual evaluation of natural attenuation processes.

Following submittal of the first Draft Long-Term Monitoring Report for Site 5, the Partnering Team concurred that both total and dissolved metals analyses were not necessary for the ongoing evaluation of the remedy, but may be necessary in the future at the conclusion of the long-term monitoring program. Therefore, dissolved metals analysis was eliminated from the long-term monitoring program in March 2001.

According to the Long-Term Monitoring Plan, after four rounds of quarterly long-term monitoring, an annual report is to be prepared that includes a statistical evaluation of groundwater data. Because the objective of the long-term monitoring program is to evaluate the effectiveness of the OU-1 remedy (i.e., determine if contaminant concentrations decrease over time), the Partnering Team concurred that statistical evaluation of the groundwater data is not necessary. Therefore, it was decided during the July 2001 Partnering Team meeting that future long-term monitoring reports would not include statistical analyses of the groundwater data. In addition, because the sampling events take place every 9 months instead of every 3 months, the Team also concurred that each long-term monitoring report would be prepared after four rounds of sampling, rather than annually.

Sediment/Surface Water Sampling

According to the Long-Term Monitoring Plan, two sediment samples (i.e., one upgradient and one downgradient of the stormwater outfall) are to be collected annually and analyzed for TCL VOCs and SVOCs and TAL metals. Because the frequency of long-term sampling was changed to tri-quarterly, the frequency of sediment sample collection was modified to coincide with the tri-quarterly schedule.

After the extent of the alluvial groundwater contaminant plume was delineated and its probable discharge point to the North Branch Potomac River identified during the Site 5 Focused RI, two additional sediment sample locations were added to the long-term monitoring program (beginning with the August 2000 event). These locations are downstream of the original sediment sample locations and were added to evaluate whether contaminants from the plume were detectable in the river. Surface water sampling was also added at all four locations for the same analyses.

Stormwater Sampling

The only change to stormwater sampling at Site 5 has been in the frequency of sample collection. The Long-Term Monitoring Plan requires that stormwater samples be collected quarterly; however, it has been determined that long-duration, high intensity precipitation is required before a sufficient quantity of runoff is observed at the outfall and that this condition rarely occurs. This has made collection of quarterly stormwater samples in accordance with the Long-Term Monitoring Plan infeasible. Since the inception of the long-term monitoring program, stormwater samples have been collected only in May 1998, January 1999, and December 1999. In an effort to improve the chance that a stormwater sample is collected during any storm event that produces flow at the outfall, an automatic sampler was installed in August 2001 that is equipped with a cellular phone to notify the treatment plant operator when samples are collected.

4.4.2 O&M Procedure Modifications

According to O&M Plan (CH2M HILL, March 1998), landfill gas monitoring is to be conducted quarterly at four landfill gas monitoring wells and two landfill gas vents. Elevated methane levels were observed in landfill gas monitoring well 5LGMW04 in December 2000. As a result, a more rigorous monitoring strategy was employed in March 2001. The more rigorous method involved using a second instrument that could directly measure methane, carbon dioxide, oxygen, and barometric pressure. In addition, a grab sample of the gas in 5LGMW04 was collected for VOC speciation. The analytical results of this sample indicated that methane represented approximately 99.99 percent of the total hydrocarbons present in the gas monitoring well. This more rigorous procedure was repeated in June and July 2001 with similar results. Since that time, the gas monitoring procedure has been modified to only use the instrument that yields direct measurement of methane, carbon dioxide, oxygen, and barometric pressure and to collect a sample for VOC speciation once per year.

5 Progress Since the Last 5-Year Review

This is the first 5-year review for the ABL Facility.

6 Five-Year Review Process

6.1 Administrative Components

The ABL Site 5 OU-1 5-year ROD review team was led by Mr. Dominic O'Connor (LANTDIV) and comprised representatives from NAVSEA (Mr. Lou Williams, Mr. David McBride, and Mr. John Aubert), USEPA Region III (Mr. Bruce Beach), and WVDEP (Mr. Tom Bass). Assistance with the 5-year review process was provided by the Navy IRP contractor, CH2M HILL.

During the October 16, 2001, Partnering Team meeting, the 5-year ROD review team established the following review schedule (the tentative date for each schedule item is shown in parentheses):

- Site Inspections (October 16, 2001 and February 12, 2002);
- Local Interviews (October 16, 2001 {O&M contractor});
- Document Review (October 16–November 30, 2001);
- Data Review (October 16–November 30, 2001);
- Draft Five-Year Review Report Development and Review (October 16, 2001–January 21, 2002); and
- Community Involvement (October 16, 2001 and February ??, 2002);
- Final Five-Year Review Report Submittal (March 22, 2002)

6.2 Community Involvement

Activities to involve the community in the 5-year review process were initiated at the October 16, 2001 Restoration Advisory Board (RAB) meeting. During the meeting, the Navy described the regulatory requirement for a 5-year ROD review, the various components of the 5-year review process, and need for one in 2002 for Site 5 because the landfill cap was installed in 1997. Relevant historical information about Site 5 was also presented. None of the attendees expressed any concern over the protectiveness of the remedy. However, notification of a public meeting held on February 13, 2002, was placed in two local newspapers (the Mineral Daily News Tribune and the Cumberland Times). The purpose of the public meeting was to present the findings of the 5-year ROD review for Site 5 OU-1 to the community members and to address any comments or questions they had.

6.3 Document Review

The 5-year review included a review of relevant documents, including O&M records and monitoring data. Appendix 4 is a list of all documents reviewed during the 5-year review process. In addition, ARARs, as listed in the Site 5 OU-1 ROD, were reviewed (see Appendix 5).

6.4 Data Review

Analytical data and related information collected during the six rounds of sampling for the Site 5 OU-1 long-term monitoring program (from May 1998 through June 2001) were reviewed. Although the long-term monitoring program was initiated under a quarterly sampling schedule, the ABL Partnering Team adjusted the schedule to triquarterly (i.e., every 9 months) to more cost-effectively monitor the effectiveness of the landfill cap over time. A discussion of the monitoring data by media is presented below.

Groundwater

Constituents detected in groundwater samples from the Site 5 alluvial and bedrock groundwater monitoring wells are summarized in Tables 1 and 2, respectively, in Appendix 6. All of the groundwater monitoring wells are shown in Figure 2. Section 4.4 notes the particular wells sampled during each of the long-term monitoring events.

Tables 1 and 2 (Appendix 6) identify the constituents detected in Site 5 groundwater and their respective Federal MCLs for drinking water and USEPA Risk-Based Concentrations (RBCs) for tap water, where applicable. Shaded values in the tables indicate an exceedance of either the MCL or tap water RBC.

Metals are the constituents most frequently detected in groundwater, which is normal for naturally occurring constituents, although some VOCs have been detected in several of the wells. A few of the detected constituents have been measured at concentrations that exceed MCLs or adjusted RBCs, but in general, constituent concentrations are relatively low. No SVOCs, herbicides, or pesticides/PCBs have been detected in Site 5 groundwater.

Since the long-term monitoring program began, in May 1998, TCE has been the only VOC detected above its MCL in alluvial and bedrock groundwater samples collected at Site 5. The detected concentrations have remained relatively constant. To date, no distinguishable trend with respect to VOC concentrations is identifiable in the alluvial or bedrock groundwater at Site 5. However, it should be noted that the long-term monitoring program has only been conducted for several years and that it may require a longer period of time before a readily identifiable trend becomes apparent.

The only total and/or dissolved metals that have been detected above their MCLs in Site 5 groundwater (downgradient of the landfill) since inception of the long-term monitoring program are antimony (two detections in bedrock) and thallium (seven detections in alluvium and four detections in bedrock). However, there is no consistency in the detections nor in the wells in which the metals were detected. Furthermore, lead has been detected only sporadically in both the alluvial and bedrock groundwater (five detections in alluvium and three detections in bedrock) above its action level.

Regarding contaminant plume migration, a focused RI conducted in 2000 evaluated the extent of the plume, identified the likely discharge point to the North Branch Potomac River, and determined that the contamination did not appear to be adversely impacting the river. Selection of a remedial action for groundwater contamination at Site 5 (i.e., OU-2) is anticipated in 2003.

Stormwater

Stormwater is collected from the perimeter drainage channel on the western side of the landfill at the location shown in Figure 2. The Site 5 Long-Term Monitoring Plan requires quarterly sampling of stormwater runoff from the Site 5 landfill. However, it has been determined that long-duration, high intensity precipitation is required before a sufficient quantity of runoff is observed at the outfall and that this condition rarely occurs, especially during the summer and winter months. Consequently, only three rounds of stormwater samples have been collected since the long-term monitoring program started (i.e., May 1998, January 1999, and December 1999).

Constituents detected in stormwater runoff samples are summarized in Table 3 of Appendix 6. The data show that the concentrations of aluminum detected in January and December 1999 exceed the West Virginia Specific Water Quality Criterion (SWQC) for aquatic life. The data also show that the detected concentrations of iron during the same sampling events exceed the human health SWQC for a potable water supply. However, this reach of the North Branch Potomac River is not used as a potable water supply. Similarly, the SWQC exceedance for nitrate in the December 1999 sample is for a potable water supply.

Evaluation of the constituents detected to date in the stormwater runoff samples does not suggest contaminants are leaching from beneath the landfill cap and entering the drainage channels.

Sediment

Constituents detected in the North Branch Potomac River sediment samples collected during the Site 5 long-term monitoring program are summarized in Table 4 of Appendix 6. Sediment samples were collected from sampling locations shown in Figure 2. Several VOCs and SVOCs have been detected in the sediment samples, but none above an RBC screening criterion (Table 4). Further, none of the detected organic constituents is likely attributable to Site 5, based on historic Site 5 groundwater data.

A number of metals have been detected in sediment samples adjacent to Site 5. Although the concentrations of several constituents exceed RBC screening criteria (i.e., arsenic, iron, and manganese), the detected concentrations of all constituents adjacent to Site 5 are similar to those at the upgradient sampling location (Table 4).

Surface Water

Surface-water sampling is not required by the Site 5 Long-Term Monitoring Plan. However, as part of a modification made during the Site 5 Focused RI investigation to assess natural attenuation processes in groundwater at the site, surface water samples have been added to the long-term monitoring program. Constituents detected in the North Branch Potomac River surface-water samples collected since August 2000 are summarized in Table 5 of Appendix 6. Surface water samples were collected from sampling locations shown in Figure 2.

No VOCs or explosive constituents have been detected in the surface-water samples. Similar to the sediment sample results, the surface-water data suggest the constituent concentrations adjacent to Site 5 are similar to those at the upgradient sampling location (Table 5).

Landfill Gas

Quarterly landfill gas monitoring is conducted at four landfill gas monitoring wells and two landfill gas vents at locations shown in Figure 2. An enhanced landfill gas monitoring program was implemented after elevated methane levels were measured in landfill gas monitoring well 5LGMW04 in December 2000. The enhanced program included an additional instrument that allows direct measurement of methane, carbon dioxide, and oxygen concentrations. In addition, grab samples were collected from 5LGMW04 in March, June, and July 2001 to quantify the various VOCs in the gas monitoring well. The results indicate that methane represents over 99.99 percent of the total hydrocarbons in the gas monitoring well. However, although elevated above the other gas monitoring wells, none of the measured VOC concentrations observed in 5LGMW04 exceed current regulatory standards, but as a precautionary measure, a flammable gas warning label has been placed on the monitoring well. The results of quarterly landfill gas monitoring are provided in Appendix 3.

A pilot study was conducted in April 2002 during which the gas in 5LGMW04 was evacuated over a period of approximately 1 week in order to evaluate the extent of the methane gas source. The ultimate objective of the pilot test is to evaluate whether a corrective action for the methane gas is necessary. Preliminary results indicate that the test successfully extracted the methane and little rebound has been observed.

6.5 Site Inspection

Two 5-year review site inspections were conducted on October 16, 2001, and on February 12, 2002, by the members of the ABL Partnering Team (i.e., LANTDIV, NAVSEA, USEPA, WVDEP, and CH2M HILL). The purpose of the inspections were to assess the protectiveness of the remedy, including the condition of the cap, stormwater drainage system and autosamplers, gas vents, gas monitoring wells, groundwater monitoring wells, and access-restriction signs. A copy of the photographic log collected during the October site inspection is presented in Appendix 7. The Inspection Checklist completed during the October 2001 inspection of Site 5 is provided in Appendix 8.

In general the various components of the remedy were observed to be in good condition. No issues that could potentially affect the protectiveness of the remedy were observed during the site inspection. Examination of the cap revealed some bare spots; however, soil samples of the cap have been collected for typing in order to identify the proper grass type for overseeding. Overseeding and fertilization will take place in 2002.

Another minor issue that was noted was that some of the monitoring well protective casings and posts needed to be repainted. A facilitywide monitoring well refurbishment program is underway at ABL. All necessary Site 5 monitoring well refurbishment activities were completed in the fall of 2001.

A number of land use control mechanisms are currently in place for Site 5 that prohibit the use or disturbance of soil and groundwater, excavation activities, disturbance of the cap, and any other activities that might interfere with the implemented remedy. No activities (past or present) were observed that might have violated the land use control mechanisms. Road access to the site is restricted by a gate that is monitored by ABL security officials. Only personnel displaying appropriate security passes are permitted access to Site 5. In addition, there are signs

posted on the east, west, north, and south sides of the landfill, stating that the property is government-owned and that trespassing is not permitted (see Appendix 7). A deed notation has been filed with Mineral County that further limits land use at Site 5 (see Appendix 2). A land use control implementation plan (LUCIP) for Site 5 is currently being developed that will formally document the land use controls that currently exist on the site and prescribes administrative review of these controls.

6.6 Interviews

Interviews were conducted with the following parties as part of the 5-year review process (the date(s) of the interviews are shown in parentheses):

- Mr. Tim Miller, Operations Management International, Inc. (OMI), Groundwater Treatment Plant Operator (October 16, 2001)
- Community Members during Public Meeting (February 13, 2002)

The groundwater treatment plant operator, who also conducts the landfill O&M activities, was interviewed by the ABL Partnering Team members on October 16, 2001. The operator stated that the O&M inspections for Site 5 are conducted on a monthly, quarterly, and annual basis. During these inspections, any problems that are identified are documented on the inspection forms. Minor problems or maintenance issues are often corrected at the time of the inspection. For those that require more substantial repairs or modifications, Navy approval is sought prior to initiating the corrective or modifying action. The resultant work typically is documented on the inspection form and detailed in monthly progress reports to the Navy. The EPA and WVDEP remedial project managers are consulted and notified regarding such activities at monthly Partnering Team meetings or through official correspondence.

The results of the Site 5 OU-1 5-year ROD review were presented to the community members, as represented during the February 13, 2002, RAB meeting. At that time questions and comments were solicited. A copy of the public meeting transcript is provided in Appendix 9.

7 Technical Assessment

The following technical assessment supports the determination that the selected remedy at ABL Site 5 OU-1 is protective of human health and the environment.

Question A: Is the remedy functioning as intended by the decision document?

The 5-year ROD review process, comprising data, document, and ARAR review; a site inspection; and personnel interviews, indicates that, in general, the remedy for OU-1 is functioning as intended by the ROD. The stabilization and capping of soil and landfill contents has achieved the primary remedial objectives of preventing direct contact with contaminated soil and landfill waste and minimizing continued leaching of contaminants to the underlying groundwater. The function of the various components of the remedy is discussed below:

- ***Administrative Documentation of Land Use Controls and Other Measures:*** Site access by road is currently restricted by a 6-foot-high, galvanized conventional chain-link fence and gate (video-monitored); access through the gate is limited to authorized personnel only and is enforced by facility security personnel. Signs are posted around the perimeter of OU-1 warning potential trespassers. Monthly inspections are conducted that include evaluating the condition of these access control measures. In addition, a deed notation has been filed with the local government disclosing landfill boundaries, potential contaminants present, and limitations placed on land use. A LUCIP is currently being prepared to formally document the land use controls that currently exist on the site and prescribe administrative review of these controls.
- ***Remedial Action Performance:*** The landfill cover system has been effective in isolating waste and contaminants from potential receptors, minimizing run-on, and minimizing the migration of contaminants to groundwater, surface water, and sediment.
- ***System Operations/O&M:*** Operation and maintenance of the cap and drainage structures has, as a whole, been effective. During site inspections, slope creep has been observed on the hillside above Channel 4; however, this condition currently does not affect the performance or integrity of the cover system, but will continue to be monitored. Minor problems are corrected during the inspections, while more substantial repairs (e.g., access road repair) or modifications (e.g., installation of stormwater autosamplers) are first approved by the Navy.
- ***Cost of System Operations/O&M:*** As noted above in Section 4, annual costs have been higher than original estimates, primarily due to a higher number of wells sampled and, therefore, analyses required. Annual O&M costs have ranged from \$64,000 to \$74,000, compared to the anticipated annual cost of \$24,000.
- ***Opportunities for Optimization:*** As a result of the review of the long-term monitoring data for groundwater, surface water, sediment and leachate, there may be an opportunity for optimization of the current sampling program. However, further modifications to the long-term monitoring program are not anticipated until the remedy for OU-2 (i.e., groundwater, surface water, and sediment) is selected.

- **Early Indicators of Potential Remedy Failure:** No early indicators of potential remedy failure were noted during the 5-year review. The level of maintenance activities has been consistent with expectations.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

- **Changes in Standards and To Be Considereds (TBCs):** No substantial changes in standards or TBCs were identified during this 5-year review that would affect the protectiveness of the remedy.
- **Changes in Exposure Pathways:** No changes in the site conditions that would affect exposure pathways were identified during the 5-year review. No new contaminants, sources, or routes of exposure were identified as part of this 5-year review. There is no indication that hydrologic or hydrogeologic conditions have changed substantially since the remedy was implemented. A higher level of protectiveness of the remedy will be achieved, however, when the LUCIP for Site 5 is implemented.
- **Changes in Toxicity and Other Contaminant Characteristics:** Although there may have been some changes in regulatory levels and risk characteristics of some contaminants at Site 5, these changes would not affect the protectiveness of the selected remedy for OU-1.
- **Changes in Risk Assessment Methodologies:** Although there have been some procedural changes to how human and ecological risk assessments are conducted, none of these changes would affect the protectiveness of the selected remedy for OU-1.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified during this review that should call into question the protectiveness of the selected remedy for OU-1.

7.1 Technical Assessment Summary

On the basis of the documents and data reviewed, the site inspections, and the interviews, the Site 5 OU-1 remedy is functioning as intended by the ROD. There have been no changes in the physical condition of the landfill cap since its construction that would affect the protectiveness of the remedy for OU-1. Nor were there any substantial changes in standards or TBCs identified during this 5-year review that would affect the protectiveness of the remedy. Further, it is not believed that any change in standard risk assessment methodology should affect the remedy protectiveness. No additional information has been identified during this review that should call into question the protectiveness of the remedy.

8 Issues

Issues that were identified during the 5-year review are noted in Table 8-1 below. None of these issues are considered by the Navy, USEPA, or WVDEP to be sufficient to warrant a finding that the remedy is not meeting its protectiveness objectives.

TABLE 8-1
Issues Identified

Issues	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Administrative Documentation of Land Use Controls		
There are land use controls in place for Site 5, including gated access, signs, and a deed notation. However, a LUCIP for Site 5 OU-1 has not been finalized. Preparation of this document should enhance the land use controls of this site.	N	N
Slope Instability		
The area of slope creep on the hillside above Discharge Channel 4 shows approximately 1 foot of offset.	N	N
Documentation of Repairs/Maintenance		
Repairs to the landfill cap and related structures are documented on the monthly inspection reports and monthly progress reports. Corrective measures and maintenance activities should be compiled into a single permanent record to provide ease of review.	N	N
Site 5 O&M and Long-Term Monitoring Plans		
A number of procedural and monitoring modifications have been made since the Site 5 O&M and Long-Term Monitoring Plans were prepared.	N	N
Landfill Gas Monitoring Well 5LGMW04 Elevated Methane Levels		
Elevated methane gas levels (relative to the other landfill gas monitoring wells and relative to the methane lower explosive limit (LEL)) have been measured in 5LGMW04 (located adjacent to the cap) since December 2000. Elevated methane has not been measured in the gas vents located within the landfill cap. Corrective actions to address methane in 5LGMW04 have been implemented and preliminary results indicate that the test successfully extracted the methane and little rebound has been observed.	N	N

9 Recommendations and Follow-up Actions

The recommendations and follow-up actions for the issues identified in Section 8 are summarized in Table 9-1 below.

TABLE 9-1
Recommendations and Follow-up Actions

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)
Land Use Controls	Prepare/implement LUCIP for Site 5.	Navy	USEPA WVDEP	2002	N
Slope Instability	Continue monitoring for additional slope creep.	Navy	USEPA WVDEP	Monthly	N
Documentation of Repairs and Maintenance	Initiate and maintain a single permanent document of all repairs and corrective actions.	Navy	USEPA WVDEP	6/14/02	N
Site 5 O&M and Long-Term Monitoring Plans	Update these plans to reflect current procedures.	Navy	USEPA WVDEP	12/31/02	N
Landfill Gas Monitoring Well 5LGMW04 Elevated Methane Levels	Undertake a study to evaluate the extent of the methane gas and to determine whether corrective action is warranted.	Navy	USEPA WVDEP	04/30/02	N

10 Protectiveness Statement

The remedy at Site 5 OU-1 is protective of human health and the environment with respect to potential contact with landfill waste and contaminated soil. A future remedy will be selected to address Site 5 OU-2 (groundwater, surface water and sediment).

The cap prevents direct contact with landfill waste and contaminated soil, and is likely effective at minimizing infiltration of precipitation and subsequent contaminant leaching to groundwater. The remedy also allows for the monitoring of landfill gases and stormwater runoff.

Land use controls (i.e., warning signs, gated access, routine site inspections, and a deed notation) are currently in place to limit access and land use. The protectiveness of the remedy currently is comparable to the level of protectiveness that existed at the time construction of the remedy was completed.

Although existing groundwater data are insufficient to determine whether contaminant leaching to groundwater has been completely mitigated, continued groundwater monitoring should provide adequate data to evaluate contaminant reduction. Furthermore, a remedy for groundwater, surface water, and sediment at Site 5 (i.e., OU-2) is anticipated in 2003.

To further ensure long-term protectiveness in the future, additional administrative controls for Site 5 may be implemented in 2002 based on future agreements between the Department of Defense and USEPA.

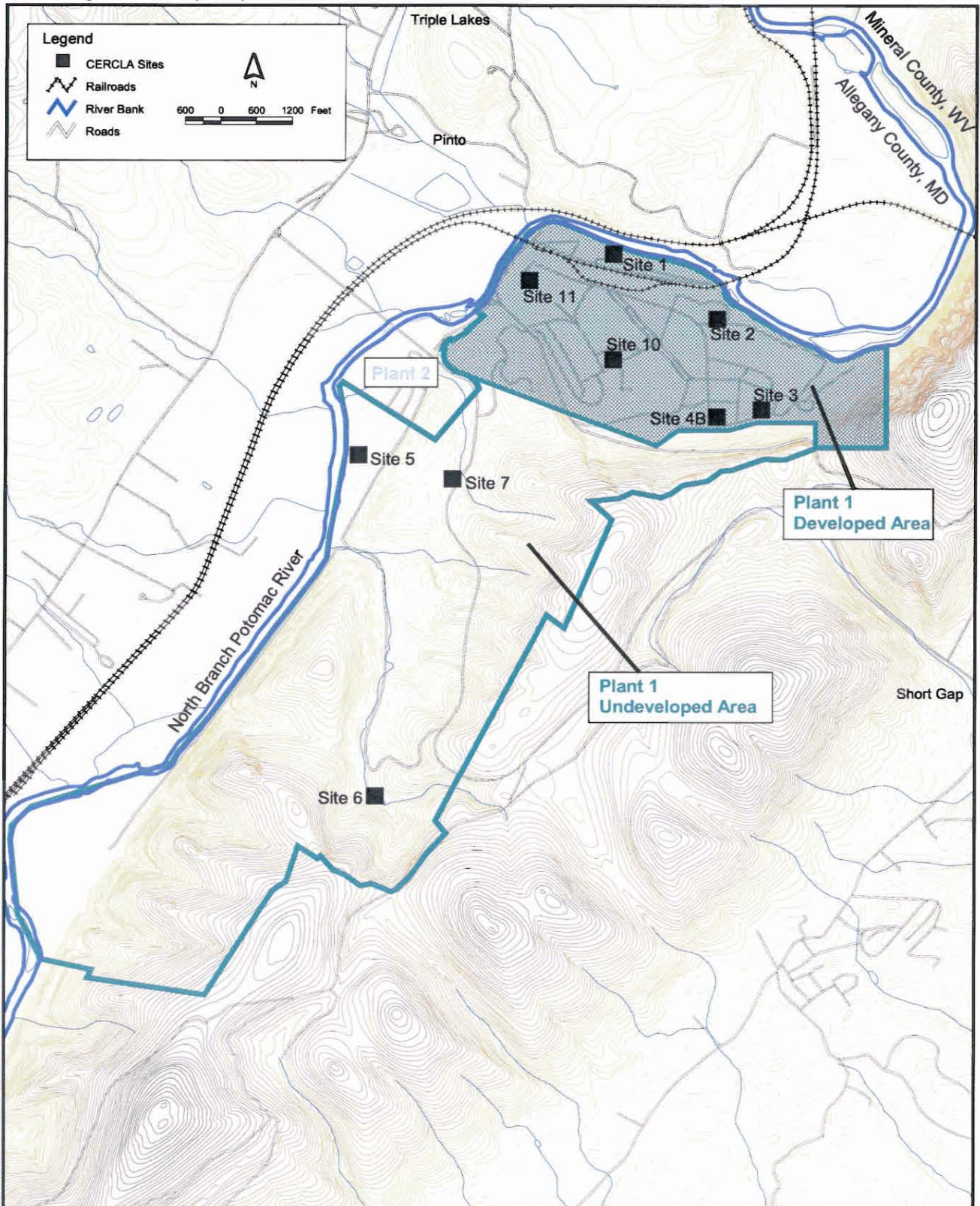
11 Next Review

This site requires statutory 5-year reviews because contaminants remain onsite above levels that permit unlimited use and unrestricted exposure. Therefore, the next 5-year review is required to be completed five years from the date on the signature page at the beginning of this report.

An update to this 5-Year ROD Review Report will be completed at the next trigger date, which is for Site 1 groundwater, June 2003. That update will include a comprehensive review of the status of all sites at ABL. Forthcoming 5-Year ROD Review Reports will be completed on a 5-year schedule starting with the current report (i.e., June 2007, June 2012, etc.).

Appendix 1

Site Maps



Source: USGS 7.5 minute Cresaptown, WV-MD digital quadrangle map

Legend

- Plant 1 - Developed Area
- Plant 1 - Undeveloped Area
- Plant 2

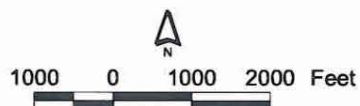
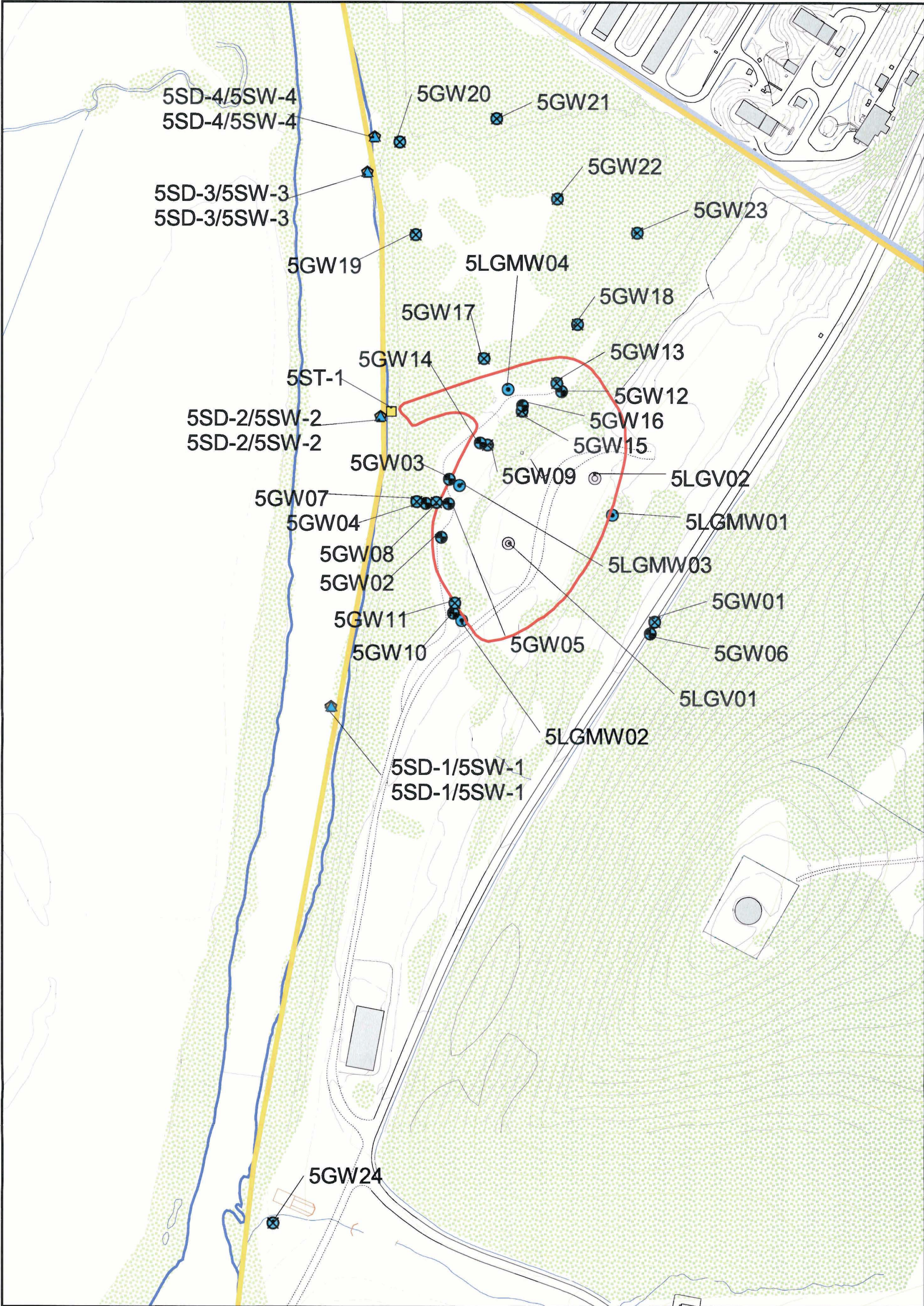


Figure 1
Facilities Map
Allegany Ballistics Laboratory

CH2MHILL



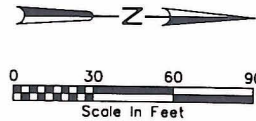
LEGEND

- Monitoring Well - Alluvial
- Monitoring Well - Bedrock
- Surface Water Sample Location
- Sediment Sample Location
- Samples: Stormwater
- MW
- Vent
- Inert Landfill Cap Boundary

Figure 2
Site 5 and Associated Features
Allegany Ballistics Laboratory

Appendix 2
Site 5 Deed Notation

NOTICE OF INACTIVE HAZARDOUS SUBSTANCE OR WASTE DISPOSAL SITE



LEGEND

- - LANDFILL GAS VENT
- - LANDFILL GAS MONITORING WELL
- ◆ - GROUNDWATER MONITORING WELL
- D.B. - DEED BOOK
- - POINT, UNLESS OTHERWISE NOTED
- △ - CONTROL POINT
- - - - - CONTOUR LINE

THE SITE 5 INERT LANDFILL OPERATED FROM THE EARLY 1960S TO 1985 AND ACCEPTED AN UNKNOWN QUANTITY OF WASTES COMPRISING DRUMS THAT PREVIOUSLY CONTAINED TRICHLOROETHENE, METHYLENE CHLORIDE, AND ACETONE; FLUORESCENT TUBES (MERCURY SOURCE); UNKNOWN LABORATORY AND PHOTOGRAPHIC CHEMICALS; FIBERGLASS AND OTHER RESIN-COATED FIBERS; METAL AND PLASTIC MACHINING WASTES; AND CONSTRUCTION AND DEMOLITION DEBRIS.

THE FOLLOWING CONSTITUENTS HAVE BEEN DETECTED IN SITE GROUNDWATER ABOVE REGULATORY THRESHOLDS (MCLs) OR SCREENING LEVELS (RBCs), OR HAVE BEEN IDENTIFIED AS CONTAMINANTS OF POTENTIAL CONCERN (COPCs):

Trichloroethylene ^{1,3}
Methylene Chloride ^{1,3}
1,2-Dichloroethane ³
Acetone ²
Bis(2-ethylhexyl)phthalate ¹
Chromium ¹
Antimony ¹
Thallium ¹
Manganese ^{2,3}
Barium ¹
Iron ²
Aluminum ²

THE FOLLOWING CONSTITUENTS, CURRENTLY UNDER THE CONSTRUCTED CAP, HAVE BEEN DETECTED IN SITE SOIL ABOVE REGULATORY SCREENING LEVELS (RBCs), OR HAVE BEEN IDENTIFIED AS CONTAMINANTS OF POTENTIAL CONCERN (COPCs):

Benz(a)pyrene ^{3,5}
Dibenz(a,h)anthracene ^{3,5}
Arsenic ^{3,4}
Iron ²

- Legend:
- MCL: Maximum Contaminant Level, EPA Drinking Water Regulations and Health Advisories, October 1995.
 - RBC: Human Health Risk-Based Concentration for Top Water, EPA Region III RBC Table, 10/01/98.
 - COPC: Contaminant of Potential Concern as Identified in Draft Focused Feasibility Study, ODN III, April 1997.
 - RBC: Human Health Risk-Based Concentration for Industrial Soil, EPA Region III RBC Table, 10/01/98.
 - RBC: Human Health Risk-Based Concentration for Residential Soil, EPA Region III RBC Table, 10/01/98.

APPROVAL

BY _____
TITLE: _____
DATE: _____

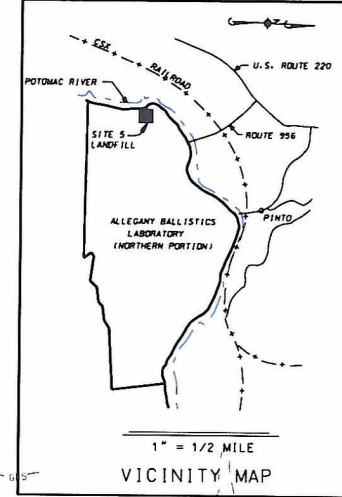
I, _____, A NOTARY PUBLIC OF SAID COUNTY AND STATE DO HEREBY CERTIFY THAT _____ DID PERSONALLY APPEAR AND SIGN BEFORE ME THIS THE _____ DAY OF _____, 1999.

NOTARY PUBLIC SIGNATURE _____
MY COMMISSION EXPIRES _____

No. 9191
CHL. CROSS SET IN
SE CORNER OF CONCRETE

CONCRETE
5 34°42'39"W

ABL-1
BRASS DISK SET IN
CONCRETE MONUMENT AT
BUILDING 300



DESCRIPTION	NORTHING	EASTING
ABL-1 - BRASS DISK IN CONCRETE	387313.589	2153701.412
T-9191 CHL. CROSS IN CONC.	385056.615	2152137.976
T-1 5/8" I PIN/CAP SET	385437.870	2151883.743
T-4 5/8" I PIN/CAP SET	385172.405	2151751.544
SGW1 ALLUVIAL MONITORING WELL	385057.938	2152138.040
SGW2 BEDROCK MONITORING WELL	385235.711	2151671.266
SGW3 BEDROCK MONITORING WELL	385363.135	2151688.424
SGW4 BEDROCK MONITORING WELL	385319.835	2151632.145
SGW5 BEDROCK MONITORING WELL	385318.796	2151681.999
SGW6 BEDROCK MONITORING WELL	385035.594	2152122.943
SGW7 ALLUVIAL MONITORING WELL	385320.082	2151614.730
SGW8 ALLUVIAL MONITORING WELL	385318.150	2151656.777
SGW9 ALLUVIAL MONITORING WELL	385442.902	2151770.527
SGW10 BEDROCK MONITORING WELL	385018.375	2151686.549
SGW11 ALLUVIAL MONITORING WELL	385099.923	2151689.993
SGW12 BEDROCK MONITORING WELL	385551.975	2151932.625
SGW13 ALLUVIAL MONITORING WELL	385565.655	2151926.131
SGW14 BEDROCK MONITORING WELL	385442.830	2151756.186
SGW15 ALLUVIAL MONITORING WELL	385514.818	2151841.969
SGW16 BEDROCK MONITORING WELL	385523.781	2151846.777
SGW17 ALLUVIAL MONITORING WELL	385518.382	2151762.878
SGW18 ALLUVIAL MONITORING WELL	385697.956	2151965.663
GAS VENT RISER 1	385229.126	2151815.629
GAS VENT RISER 2	385369.019	2152003.048
GV-1	385290.430	2152040.986
GV-2	385062.997	2151713.497
GV-3	385353.184	2151708.688
GV-4	385558.992	2151814.695

NOTES:

- COORDINATE SYSTEM AS SHOWN HEREON IS WEST VIRGINIA STATE PLANE.
- THE TOPOGRAPHY AS SHOWN HEREON IS FROM DRAFT-CONTRACTORS CLOSEOUT REPORT, LANDFILL CAP CONSTRUCTION, SITE 5-INERT LANDFILL, OHM REMEDIATION SERVICES CORP., NOVEMBER 1997.
- NO TITLE INFORMATION WAS SUPPLIED FOR THIS SURVEY.
- THIS PROPERTY SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.
- THE LOCATION OF THE LANDFILL CAP AS SHOWN HEREON IS BASED ON AN ACTUAL FIELD SURVEY OF THE PRESENT CONDITIONS OF THE SURFACE BY CHAPMAN'S SURVEYING, INC. IN APRIL, 1999.
- THIS LANDFILL LIES WITHIN PROPERTY OBTAINED BY CONDEMNATION CIVIL NO. 295-W-09 JULY 1962 - 371.20 ACRES, FINAL ENVIRONMENTAL BASELINE SURVEY FOR ABL, VOLUME 1, BAKER, ENVIRONMENTAL, INC. NOVEMBER 1997.)

SURVEYORS CERTIFICATION

I, LOWELL L. CHAPMAN, STATE TO THE BEST OF MY KNOWLEDGE AND PROFESSIONAL BELIEF THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED BOOK 140 PAGE 561) THAT THE BOUNDARIES SHOWN ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION SHOWN; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH GS 47-30, AS AMENDED WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS _____ DAY OF 1999.

LOWELL L. CHAPMAN, C.E. R.L.S.
WEST VIRGINIA REGISTRY NO. 249

PERIMETER OF LANDFILL CAP		
COURSE	BEARING	DISTANCE
1	N 15°15'31"W	52.47'
2	N 02°55'19"E	51.47'
3	N 04°45'20"E	29.74'
4	N 28°03'08"E	59.30'
5	N 35°42'09"E	56.25'
6	N 46°04'10"E	58.99'
7	N 40°28'04"E	55.17'
8	N 47°57'40"E	55.09'
9	N 60°01'46"E	53.13'
10	N 76°57'17"E	55.47'
11	S 88°04'47"E	35.37'
12	S 37°09'45"E	46.92'
13	S 29°16'54"E	60.02'
14	S 08°00'16"E	43.10'
15	S 05°14'49"W	83.93'
16	S 26°43'18"W	43.31'
17	S 34°34'16"W	48.36'
18	S 32°35'14"W	47.79'
19	S 48°06'39"W	30.69'
20	N 36°40'03"W	20.10'
21	N 03°39'02"W	15.47'
22	N 41°52'56"W	31.70'
23	N 76°14'36"W	31.21'
24	S 44°02'05"W	18.51'
25	S 16°22'52"W	41.97'
26	S 11°15'43"W	48.16'
27	S 35°07'49"W	11.19'
28	S 46°09'08"W	26.89'
29	S 52°05'13"W	51.14'
30	S 83°52'48"W	51.60'
31	N 63°23'59"W	11.21'
32	N 35°34'24"W	42.73'
33	N 27°06'06"W	34.78'

PROPERTY USE RESTRICTIONS AND EFFECT OF FILING:

- HAZARDOUS SUBSTANCES WERE FORMERLY DISPOSED OF ON THE REAL PROPERTY DELINEATED HEREIN. PURSUANT TO THE RECORD OF DECISION ISSUED UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) BY THE DEPARTMENT OF THE NAVY AND THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, DATED 12 FEBRUARY 1997 (SITE 5 ROD), USE OF THE DELINEATED AREA MAY NOT RESULT IN DISTURBANCE OF THE COVER THAT IS IN PLACE IN THE FORMER DISPOSAL AREA. SPECIFICALLY, TO COMPLY WITH THE CERCLA SITE 5 ROD, THE DEPARTMENT OF THE NAVY MUST ENSURE THAT THE INTEGRITY OF THE FINAL COVER, LINERS, AND OTHER COMPONENTS OF THE CONTAINMENT SYSTEM OR THE FUNCTION OF THE FACILITY'S MONITORING SYSTEM ARE NOT DISTURBED. SUCH RESTRICTIONS, BASED ON REQUIREMENTS IN 40 CODE OF FEDERAL REGULATIONS (CFR) PART 264, SUBPART G, WERE DETERMINED TO BE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) PURSUANT TO THE CERCLA SITE 5 ROD. IF THE DEPARTMENT OF THE NAVY WISHES TO TAKE ANY ACTION THAT IS INCONSISTENT WITH THESE RESTRICTIONS, IT MUST FOLLOW PROCEDURES ESTABLISHED BY CERCLA AND THE NATIONAL CONTINGENCY PLAN (NCP).
- THE FILING OF THIS DOCUMENT IN NO WAY SHOULD BE INTERPRETED AS A DISPOSITION OR ALIENATION OF ANY REAL PROPERTY INTEREST HELD BY THE UNITED STATES FOR THE PROPERTY DESCRIBED HEREIN.
- THE FILING OF THIS DOCUMENT CREATES NO INDEPENDENT ENFORCEMENT AUTHORITIES IN THE STATE OF WEST VIRGINIA OR THIRD PARTIES.
- BOTH THE STATE OF WEST VIRGINIA AND THE DEPARTMENT OF THE NAVY AGREE THAT NO INTEREST IN REAL PROPERTY (i.e., RESTRICTIVE COVENANT) ON BEHALF OF THE STATE OF WEST VIRGINIA OR ANY OTHER PARTY IS CREATED WITH THE FILING OF THIS DOCUMENT.
- NOTHING IN THE DOCUMENT SHOULD BE CONSTRUED TO CREATE ANY OBLIGATION INCONSISTENT WITH THOSE IMPOSED ON THE DEPARTMENT OF THE NAVY UNDER THE CERCLA SITE 5 ROD FOR ACTION TAKEN ON THE REAL PROPERTY DESCRIBED HEREIN.
- USE RESTRICTIONS IDENTIFIED IN THIS DOCUMENT ON THE USE OF THE REAL PROPERTY DESCRIBED HEREIN ARE IMPOSED PURSUANT TO THE CERCLA SITE 5 ROD. SUCH USE RESTRICTIONS ARE NOT COVENANTS RUNNING WITH THE LAND. ANY RESTRICTIVE COVENANTS LIMITING USE OF THE REAL PROPERTY DESCRIBED HEREIN THAT MAY BE NECESSARY DUE TO THE PROPERTY'S TRANSFER WILL BE FILED SEPARATELY.

VOLUME: 485
COORDINATE FILE: 990028.CRD
PLOT FILE: 99017.PL

NO.	REVISION	DATE	DRW	APP

SHEET NO.

One

OF One

DATE: 08 April 1999

Site 5 Landfill Cap Location
Allegany Ballistics Laboratory
Rocket Center - Mineral County - West Virginia

PROJECT NO. 99-017
DESIGN BY: CES
DRAWN BY: CES
CHECKED BY: LLC
SCALE: 1" = 30'

Lead Surveyors
Chapman's Surveying, Inc.
11802 Old Capitol Rd. SE
FREDERICK, MD 21732
PHONE: 301-469-3173
FAX: 301-469-9429

PROJECT NO. 99-017
DESIGN BY: CES
DRAWN BY: CES
CHECKED BY: LLC
SCALE: 1" = 30'

Appendix 3

Landfill Inspection Reports

SITE 5 QUARTERLY MONITORING LOG

JDAY'S DATE: 03/13/2002

WEATHER CONDITIONS: Cloudy 40's

MONITORING DONE BY:

Tim Miller

BKD. TPH (ppmv): 0.0 ppm

WIND DIRECTION: North 5 mph

Landfill Gas Monitoring (Landtec GA-90)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (%)	Carbon Dioxide, Oxygen, and Pressure (units given)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	0.0 ppm	0.0%	CO2 = 0.0%; O2 = 12.2%; pressure = 29.1 "hg	20	14
Gas vent 5LGV02	0.0 ppm	0.0%	CO2 = 0.0%; O2 = 20.7%; pressure = 29.1 "hg	14	19
Monitoring well 5LGMW01	--	0.0%	CO2 = 0.2%; O2 = 20.1%; pressure = 29.1 "hg	--	--
Monitoring well 5LGMW02	--	0.0%	CO2 = 0.7%; O2 = 19.9%; pressure = 29.1 "hg	--	--
Monitoring well 5LGMW03	--	0.0%	CO2 = 0.7%; O2 = 19.8%; pressure = 29.1 "hg	--	--
Monitoring well 5LGMW04	--	10.8%	CO2 = 0.2%; O2 = 10.5%; pressure = 29.1 "hg	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition.

SITE 5 QUARTERLY MONITORING LOG
TODAY'S DATE: 12/13/2001
WEATHER CONDITIONS: Cldy-40's
MONITORING DONE BY:
Tim Miller
BKD. TPH (ppmv): 0.0 ppm
WIND DIRECTION: none

Landfill Gas Monitoring (TVA-100)					
Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane %	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	24.5ppm	0.0%	24.5ppm	17	16
Gas vent 5LGV02	14.1ppm	0.0%	14.1ppm	10	27
Monitoring well 5LGMW01	--	0.0%	--	--	--
Monitoring well 5LGMW02	--	0.0%	--	--	--
Monitoring well 5LGMW03	--	0.0%	--	--	--
Monitoring well 5LGMW04	--	6.9%	--	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring	
Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 09/27/2001

WEATHER CONDITIONS: Clear 80

MONITORING DONE BY:

Joe Kenderdine/ Tim Miller

BKD. Methane (%): 0.00%

WIND DIRECTION: none

Landfill Gas Monitoring (Landtec GA-90)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (%)	Carbon Dioxide, Oxygen, and Pressure (units given)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	--	0.0%	CO2 = 0.8%; O2 = 20.0%; pressure = 28.8"Hg	19	14
Gas vent 5LGV02	--	0.0%	CO2 = 0.0%; O2 = 21.4%; pressure = 28.9"hg	13	21
Monitoring well 5LGMW01	--	0.0%	CO2 = 0.6%; O2 = 21.5%; pressure = 28.8"Hg	--	--
Monitoring well 5LGMW02	--	0.0%	CO2 = 13.5%; O2 = 4.8%; pressure = 28.9"Hg	--	--
Monitoring well 5LGMW03	--	0.0%	CO2 = 9.3%; O2 = 13.4%; pressure = 28.9"Hg	--	--
Monitoring well 5LGMW04	--	13.2%	CO2 = 17.2%; O2 = 0.0%; pressure = 28.9"Hg	--	--

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition.

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 09/27/2001

WEATHER CONDITIONS: Clear 80

MONITORING DONE BY:

Tim Miller

BKD. TPH (ppmv): 0.0 ppm

WIND DIRECTION: none

Landfill Gas Monitoring (TVA-100)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (ppmv)	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	6.3 ppm	4.6 ppm	1.7 ppm	19	14
Gas vent 5LGV02	1.2 ppm	0.6 ppm	0.6 ppm	13	21
Monitoring well 5LGMW01	--	--	--	--	--
Monitoring well 5LGMW02	--	--	--	--	--
Monitoring well 5LGMW03	--	--	--	--	--
Monitoring well 5LGMW04	--	--	--	--	--

Note: Methane readings at the monitoring wells 5LGMW01 through 5LGMW04 were taken with the Landtec GA90

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition.

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 07/25/2001

WEATHER CONDITIONS: Clear 85

MONITORING DONE BY:

Joe Kenderdine

BKD. TPH (ppmv): 0.0 ppm

WIND DIRECTION: none

Landfill Gas Monitoring (Landtec GA-90)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (%)	Carbon Dioxide, Oxygen, and Pressure (units given)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	---	---	---	---	---
Gas vent 5LGV02	---	---	---	---	---
Monitoring well 5LGMW01	---	---	---	---	---
Monitoring well 5LGMW02	---	---	---	---	---
Monitoring well 5LGMW03	---	---	---	---	---
Monitoring well 5LGMW04	---	11.9%	CO2 = 13.1%; O2 = 0.0%; pressure = 28.8"Hg	---	---

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition.

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 06/20/2001

WEATHER CONDITIONS: Clear 75

MONITORING DONE BY:

Joe Kenderdine

BKD. TPH (ppmv): 0.0 ppm

WIND DIRECTION: none

Landfill Gas Monitoring (Landtec GA-90)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (%)	Carbon Dioxide, Oxygen, and Pressure (units given)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	--	0.0%	CO2 = 0.0%; O2 = 20.9%; pressure = 29.2"Hg	12	23
Gas vent 5LGV02	--	0.0%	CO2 = 0.0%; O2 = 20.6%; pressure = 29.2"hg	20	14
Monitoring well 5LGMW01	--	0.0%	CO2 = 4.4%; O2 = 18.5%; pressure = 29.3"Hg	--	--
Monitoring well 5LGMW02	--	0.0%	CO2 = 8.1%; O2 = 3.0%; pressure = 29.2"Hg	--	--
Monitoring well 5LGMW03	--	0.0%	CO2 = 5.4%; O2 = 12.2%; pressure = 29.3"Hg	--	--
Monitoring well 5LGMW04	--	0.5%	CO2 = 0.3%; O2 = 19.3%; pressure = 29.3"Hg	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition.

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 06/20/2001

WEATHER CONDITIONS: Clear 75

MONITORING DONE BY:

Joe Kenderdine

BKD. TPH (ppmv): 0.0 ppm

WIND DIRECTION: none

Landfill Gas Monitoring (TVA-100)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (ppmv)	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	14 ppm	1 ppm	13 ppm	12	23
Gas vent 5LGV02	8 ppm	3 ppm	5 ppm	20	14
Monitoring well 5LGMW01	--	44 ppm	--	--	--
Monitoring well 5LGMW02	--	1 ppm	--	--	--
Monitoring well 5LGMW03	--	12 ppm	--	--	--
Monitoring well 5LGMW04	--	1550 ppm	--	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition.

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 03/29/2001

WEATHER CONDITIONS: Rain mid 40's

MONITORING DONE BY:
Joe Kenderdine

BKD. TPH (ppmv): 0.0 ppm

WIND DIRECTION: none

Landfill Gas Monitoring (Landtec GA-90)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (%)	Carbon Dioxide, Oxygen, and Pressure (units given)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	--	0.0%	CO2 = 0.2%; O2 = 19.3%; pressure = 996 mBars	22	12.3
Gas vent 5LGV02	--	0.0%	CO2 = 4.6%; O2 = 9.5%; pressure = 996 mBars	12	22.5
Monitoring well 5LGMW01	--	0.0%	CO2 = 0.2%; O2 = 20.1%; pressure = 995 mBars	--	--
Monitoring well 5LGMW02	--	0.0%	CO2 = 0.7%; O2 = 19.9%; pressure = 997 mBars	--	--
Monitoring well 5LGMW03	--	0.0%	CO2 = 0.7%; O2 = 19.8%; pressure = 997 mBars	--	--
Monitoring well 5LGMW04	--	0.1%	CO2 = 0.2%; O2 = 20.5%; pressure = 997 mBars	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition. Tree branches removed from channel.

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 03/29/2001

WEATHER CONDITIONS: Rain mid 40's

MONITORING DONE BY:

Joe Kenderdine

BKD. TPH (ppmv): 0.0 ppm

WIND DIRECTION: none

Landfill Gas Monitoring (TVA-100)

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (ppmv)	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	28.8 ppm	22.7 ppm	6.1 ppm	22	12.3
Gas vent 5LGV02	0.15 ppm	0.15 ppm	0.0 ppm	12	22.5
Monitoring well 5LGMW01	--	0.3 ppm	--	--	--
Monitoring well 5LGMW02	--	0.0 ppm	--	--	--
Monitoring well 5LGMW03	--	0.0 ppm	--	--	--
Monitoring well 5LGMW04	--	660 ppm	--	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring

Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good condition. Tree branches removed from channel.

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 12/11/2000

WEATHER CONDITIONS: cloudy mid 30's

MONITORING DONE BY:
Hubert Ling

BKD. TPH (ppmv): _____

WIND DIRECTION: South 5 mph

Landfill Gas Monitoring					
Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (ppmv)	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	--	--	--	--	--
Gas vent 5LGV02	--	--	--	--	--
Monitoring well 5LGMW01	--	--	--	--	--
Monitoring well 5LGMW02	--	--	--	--	--
Monitoring well 5LGMW03	--	--	--	--	--
Monitoring well 5LGMW04	--	38,500 ppm	--	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring	
Monitoring Feature	Observations
North Slope	No leachate observed
West Slope	No leachate observed
Drainage structures	Good Condition

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 12/04/2000

WEATHER CONDITIONS: cloudy mid 20's

MONITORING DONE BY:
Mike D'Arrigo

BKD. TPH (ppmv): _____

WIND DIRECTION: South 5 mph

Landfill Gas Monitoring					
Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (ppmv)	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	5615 ppm	5450 ppm	165 ppm	10	27.0
Gas vent 5LGV02	6820 ppm	6460 ppm	360 ppm	14	19.3
Monitoring well 5LGMW01	--	.56 ppm	--	--	--
Monitoring well 5LGMW02	--	1.90 ppm	--	--	--
Monitoring well 5LGMW03	--	11.71 ppm	--	--	--
Monitoring well 5LGMW04	--	26,600 ppm	--	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring	
Monitoring Feature	Observations
North Slope	No leachate Observed
West Slope	No leachate Observed
Drainage structures	Good Condition

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 08/10/2000

WEATHER CONDITIONS: P. cloudy, low 80's

MONITORING DONE BY:
Mike D'Arrigo

BKD. TPH (ppmv): _____

WIND DIRECTION: North 5 mph

Landfill Gas Monitoring

Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (ppmv)	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	1.19 ppm	1.14 ppm	.05 ppm	0	0
Gas vent 5LGV02	1.04 ppm	1.01 ppm	.03 ppm	0	0
Monitoring well 5LGMW01	--	.19 ppm	--	--	--
Monitoring well 5LGMW02	--	1.01 ppm	--	--	--
Monitoring well 5LGMW03	--	8.70 ppm	--	--	--
Monitoring well 5LGMW04	--	2880 ppm	--	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring

Monitoring Feature	Observations
North Slope	None Observed
West Slope	None Observed
Drainage structures	Good Condition

SITE 5 QUARTERLY MONITORING LOG

TODAY'S DATE: 05/09/2000

WEATHER CONDITIONS: Clear low 80's

MONITORING DONE BY:
Mike D'Arrigo

BKD. TPH (ppmv): _____

WIND DIRECTION: North East

Landfill Gas Monitoring					
Monitoring Structure	(A) Total Hydrocarbons (ppmv)	(B) Methane (ppmv)	Total VOCs[(A)-(B)] (ppmv)	Time (seconds)	Velocity (fpm)
Gas vent 5LGV01	.68 ppm	.19 ppm	.49 ppm	0	0
Gas vent 5LGV02	.65 ppm	.62 ppm	.03 ppm	0	0
Monitoring well 5LGMW01	--	.84ppm	--	--	--
Monitoring well 5LGMW02	--	.88 ppm	--	--	--
Monitoring well 5LGMW03	--	264 ppm	--	--	--
Monitoring well 5LGMW04	--	562 ppm	--	--	--

Note: Only methane readings are used at the monitoring wells 5LGMW01 through 5LGMW04.

Leachate Monitoring	
Monitoring Feature	Observations
North Slope	None Observed
West Slope	None Observed
Drainage structures	Good Condition

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 05/31/2002

WEATHER CONDITIONS: Clear 80's

INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections. Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time. Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 04/26/2002WEATHER CONDITIONS: cloudy 50'sINSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections. Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time. Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 03/13/2002

WEATHER CONDITIONS: Cloudy 40's

INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time.

Monthly inspection is recommended, but no other actions are necessary at this time.

2. Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections.

Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time.

Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 02/25/2002WEATHER CONDITIONS: Clear 65INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time.

Monthly inspection is recommended, but no other actions are necessary at this time.

2. Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections.

Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time.

Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 01/22/2002

WEATHER CONDITIONS: Clear 45

INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time.

Monthly inspection is recommended, but no other actions are necessary at this time.

2. Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections.

Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time.

Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 12/13/2001WEATHER CONDITIONS: Cloudy 40'sINSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections. Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time. Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 11/30/2001WEATHER CONDITIONS: Clear 60'sINSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time.

Monthly inspection is recommended, but no other actions are necessary at this time.

2. Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections.

Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time.

Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 10/26/2001

WEATHER CONDITIONS: Cldy 50's

INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections. Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time. Fallen trees will be removed from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 09/27/2001

WEATHER CONDITIONS: Clear 80

INSPECTION DONE BY: Tim Miller/ Joe Kenderline

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections. Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time. Fallen trees will be removed from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 08/30/2001WEATHER CONDITIONS: Clear 85INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time.

Monthly inspection is recommended, but no other actions are necessary at this time.

2. Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections.

Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time.

Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 07/25/2001WEATHER CONDITIONS: Clear 85INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Noted 14 dead trees at the north end landfill, just outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 06/20/2001

WEATHER CONDITIONS: Clear 75

INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 05/25/2001

WEATHER CONDITIONS: Clear mid 60's

INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Tree branches in channel have been removed. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 04/25/2001

WEATHER CONDITIONS: Clear mid 50's

INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Tree branches in channel removed. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 03/29/2001

WEATHER CONDITIONS: Rain mid 40's

INSPECTION DONE BY: Joe Kenderline

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Tree branches in channel removed. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 02/28/2001WEATHER CONDITIONS: Clear mid 30'sINSPECTION DONE BY: Hubert Ling

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 01/23/2001

WEATHER CONDITIONS: Clear mld 30's

INSPECTION DONE BY: Hubert Ling

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 12/27/2000

WEATHER CONDITIONS: Clear mid 20's

INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 10/31/2000
WEATHER CONDITIONS: Clear mid 80's
INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 09/18/2000
WEATHER CONDITIONS: Clear mid 80's
INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 08/17/2000

WEATHER CONDITIONS: P. Cloudy, low 80's

INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road in good condition following installation of additional aggregate.	X		Additional aggregate was installed by a subcontractor.	August 17, 2000
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition...	X		See Comment # 1. See Comment # 2: Work was performed by a subcontractor	August 17, 2000

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

2. Riprap ditch has been reworked by a subcontractor to promote proper drainage (Aug. 2000).

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 07/31/2000

WEATHER CONDITIONS: P. Cloudy, low 80's

INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X		Additional aggregate will be installed by a subcontractor.	work contracted for mid-Aug. 2000
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X		See comment number 3.	work contracted for mid-Aug. 2000

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Runoff water runs along edge of CD-5 riprap approximately 30'; fill needs to be added to increase the elevation. This remedial action will be conducted by a subcontractor in August 2000.
- Riprap is covered with dirt approximately 20' from outlet of pipe in CD-2 a distance of 30' (northwest toe of the landfill). Regrading and reinstallation of riprap by a subcontractor will be performed.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 06/27/2000

WEATHER CONDITIONS: Light rain, low 80's

INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X		Additional aggregate will be installed by a subcontractor.	August 2000 (tentative date)
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X		See comment number 3.	August 2000 (tentative date)

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Runoff water runs along edge of CD-5 riprap approximately 30'; fill needs to be added to increase the elevation. This remedial action will be conducted by a subcontractor, planned for summer 2000.
- Riprap is covered with dirt approximately 20' from outlet of pipe in CD-2 a distance of 30' (northwest toe of the landfill). Excavation by a subcontractor will be performed in summer 2000.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 05/09/2000

WEATHER CONDITIONS: Clear low 80's

INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X		Additional aggregate will be installed by a subcontractor.	June 2000 (tentative date)
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation on vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X		See comment number 4.	June 2000 (tentative date)

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

2. Runoff water runs along edge of CD-5 riprap approximately 30'; fill needs to be added to increase the elevation. This remedial action will be conducted by a subcontractor, planned for summer 2000.

3. Riprap is covered with dirt approximately 20' from outlet of pipe in CD-2 a distance of 30' (northwest toe of the landfill). Excavation by a subcontractor will be performed in summer 2000.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 04/28/2000WEATHER CONDITIONS: temp mid 50'sINSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X		Additional aggregate will be installed by a subcontractor.	June 2000 (tentative date)
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation on vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X		See comment number 4.	June 2000 (tentative date)

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Drainage ditch uphill of the landfill shows small signs of slippage starting approximately 85' off of the entrance road and continuing approximately 75' towards the Potomac River. Periodic inspection for increasing slippage is recommended, but no other remedial action is required at this time.

2. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

3. Runoff water runs along edge of CD-5 riprap approximately 30'; fill needs to be added to increase the elevation. This remedial action will be conducted by a subcontractor, planned for early summer.

4. Riprap is covered with dirt approximately 20' from outlet of pipe in CD-2 a distance of 30' (northwest toe of the landfill). Excavation by a subcontractor will be performed in early summer 2000.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 03/15/2000WEATHER CONDITIONS: temp mid 50'sINSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X		Additional aggregate will be installed by a subcontractor.	Early summer 2000
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X		See comment number 4.	Early Summer 2000

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Drainage ditch uphill of the landfill shows small signs of slippage starting approximately 85' off of the entrance road and continuing approximately 75' towards the Potomac River. Periodic inspection for increasing slippage is recommended, but no other remedial action is required at this time.

2. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

3. Runoff water runs along edge of CD-5 riprap approximately 30'; fill needs to be added to increase the elevation. This remedial action will be conducted by a subcontractor, planned for early summer 2000.

4. Riprap is covered with dirt approximately 20' from outlet of pipe in CD-2 a distance of 30' (northwest toe of the landfill). Excavation by a subcontractor will be performed in early summer 2000.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 02/17/2000

WEATHER CONDITIONS: temp low 40's

INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X		Additional aggregate will be installed by a subcontractor.	Early Summer 2000
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X		See comment number 4.	Early Summer 2000

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Drainage ditch uphill of the landfill shows small signs of slippage starting approximately 85' off of the entrance road and continuing approximately 75' towards the Potomac River. Periodic inspection for increasing slippage is recommended, but no other remedial action is required at this time.
2. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
3. Runoff water runs along edge of CD-5 riprap approximately 30'; fill needs to be added to increase the elevation. This remedial action will be conducted by a subcontractor, planned for early summer.
4. Riprap is covered with dirt approximately 20' from outlet of pipe in CD-2 a distance of 30' (northwest toe of the landfill). Excavation by a subcontractor will be performed in early summer 2000.
5. The operator repaired parts of the silt fence around the site that was torn off of the stakes by the recent heavy snow.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 01/20/2000

WEATHER CONDITIONS: overcast mid 20's

INSPECTION DONE BY: Mike D'Arrigo

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X		Additional aggregate will be installed by a subcontractor.	Early Summer 2000
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X		See comment number 4.	Early Summer 2000

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Drainage ditch uphill of the landfill shows small signs of slippage starting approximately 85' off of the entrance road and continuing approximately 75' towards the Potomac River. Periodic inspection for increasing slippage is recommended, but no other remedial action is required at this time.

2. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.

3. Runoff water runs along edge of CD-5 riprap approximately 30'; fill needs to be added to increase the elevation. This remedial action will be conducted by a subcontractor, planned for early summer 2000.

4. Riprap is covered with dirt approximately 20' from outlet of pipe in CD-2 a distance of 30' (northwest toe of the landfill). Excavation by a subcontractor will be performed in early summer 2000.

5. Brush was cleaned out of the riprap at the discharge point into the Potomac River by the operator.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 12/19/1999
WEATHER CONDITIONS: sunny 40s
INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 12/19/1999 **WEATHER CONDITIONS:** sunny 40s

INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

Slough #4 has a width of 2 inches, and is approximately 70 feet in length. Slough #5 has a maximum width of 4 inches (over 40% of its length) and is approximately 70 feet in length. There is now evidence of soil bulging at the toe of the slope. There is now evidence of bulding at 30 feet upslope from the perimeter drainage swale, and the soil and the toe of the slope is nearly overtopping the silt fence.

A Slough Area is developing in the southern half of the repair area. This area ia approximately 30 feet upslope of the 24-inch HDPE culvert that was installed during the initial repair work. This Slough is approximately 40 feet in length and is 1/4 - inch in width.

No inccase in footage of any of the slough area.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 11/19/1999

WEATHER CONDITIONS: sunny 40s

INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 11/19/1999

WEATHER CONDITIONS: sunny 40s

INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

Slough #4 has a width of 2 inches, and is approximately 70 feet in length. Slough #5 has a maximum width of 4 inches (over 40% of its length) and is approximately 70 feet in length. There is now evidence of soil bulging at the toe of the slope. There is now evidence of bulging at 30 feet upslope from the perimeter drainage swale, and the soil and the toe of the slope is nearly overtopping the silt fence.

A Slough Area is developing in the southern half of the repair area. This area is approximately 30 feet upslope of the 24-inch HDPE culvert that was installed during the initial repair work. This Slough is approximately 40 feet in length and is 1/4 - inch in width.

No increase in footage of any of the slough area.

Extreme drought conditions have kept grass growth low. The grass is approx. 2 feet on hillside and 1 foot tall on flats.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 10/27/1999
WEATHER CONDITIONS: Sunny 50 degrees F
INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 10/27/1999

WEATHER CONDITIONS: Sunny 50 degrees F

INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

Slough #4 has a width of 2 inches, and is approximately 70 feet in length. Slough #5 has a maximum width of 4 inches (over 40% of its length) and is approximately 70 feet in length. There is now evidence of soil bulging at the toe of the slope. There is now evidence of bulging at 30 feet upslope from the perimeter drainage swale, and the soil and the toe of the slope is nearly overtopping the silt fence.

A Slough Area is developing in the southern half of the repair area. This area is approximately 30 feet upslope of the 24-inch HDPE culvert that was installed during the initial repair work. This Slough is approximately 40 feet in length and is 1/4 - inch in width.

No increase in footage of any of the slough area.

Extreme drought conditions have kept grass growth low. The grass is approx. 2 feet on hillside and 1 foot tall on flats.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 09/30/1999
WEATHER CONDITIONS: overcast, 65
INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 09/30/1999
WEATHER CONDITIONS: overcast, 65
INSPECTION DONE BY: Tony A. Refosco

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 9/2/1999 (Note 1) **WEATHER CONDITIONS:** sunny, 82 degrees
INSPECTION DONE BY: John E. Nock

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X		Accumulation of bee's nests in all the vent risers corrected as a result of spraying.	Removed 09/02/1999
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		All vegetation is dead due to lack of rain and extreme drought conditions	

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 9/2/1999 (Note 1)
WEATHER CONDITIONS: sunny, 82 degrees
INSPECTION DONE BY: John E. Nock

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

NOTE 1: Inspection performed on 9/2/99 for August event due to scheduling

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

No increase in footage of any of the slough area.

Extreme drought conditions have killed all vegetation. Grass height is approx. 3 feet.

No significant changes from last month

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 07/29/1999
WEATHER CONDITIONS: 90 degrees, hot, humid
INSPECTION DONE BY: John E. Nock

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X		Accumulation of bee's nests in all the vent risers. I sprayed all vents with bee repellants.	07/29/1999
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		All vegetation is dead due to lack of rain and extreme drought conditions	

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 07/29/1999 **WEATHER CONDITIONS:** 90 degrees, hot , humid

INSPECTION DONE BY: John E. Nock

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

No increase in footage of any of the slough area.

Extreme drought conditions have killed all vegetation. Grass height is approx. 3 feet.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 06/30/1999
WEATHER CONDITIONS: 85 degrees, humid
INSPECTION DONE BY: John E. Nock

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible, vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 06/30/1999
WEATHER CONDITIONS: 85 degrees, humid
INSPECTION DONE BY: John E. Nock

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

No new items of concern since last inspection.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 05/27/1999
WEATHER CONDITIONS: Clear 66 Degrees
INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 05/27/1999 **WEATHER CONDITIONS:** Clear 66 Degrees

INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

The section identified as Slough Area #1 (the furthest upslope crack) has increased to a minimum of 1-inch wide along 100% of its length (Approx. 300'), which extends through the entire length of the repair area.

The section identified as Slough Area #2 has increased in length from 70 to 90 feet. The width of the crack has not changed from March 2, 1999.

The area encompassed by Slough Area #3 has developed numerous small cracks and seeps.

Two new Slough Areas have been identified, Areas 4 and 5. Slough #4 is approximately 10 feet downslope of Slough #1, and Slough #5 is approximately 10 feet downslope of Slough #4.

Slough #4 has a width of 2 inches, and is approximately 70 feet in length. Slough #5 has a maximum width of 4 inches (over 40% of its length) and is approximately 70 feet in length.

There is now evidence of soil bulging at the toe of the slope. There is now evidence of bulging at 30 feet upslope from the perimeter drainage swale, and the soil and the toe of the slope is nearly overtopping the silt fence.

A Slough Area is developing in the southern half of the repair area. This area is approximately 30 feet upslope of the 24-inch HDPE culvert that was installed during the initial repair work. This Slough is approximately 40 feet in length and is 1/4 - inch in width.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 04/30/1999
WEATHER CONDITIONS: Clear 62 Degrees
INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 04/30/1999

WEATHER CONDITIONS: Clear 62 Degrees

INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

The section identified as Slough Area #1 (the furthest upslope crack) has increased to a minimum of 1-inch wide along 100% of its length (Approx. 300'), which extends through the entire length of the repair area.

The section identified as Slough Area #2 has increased in length from 70 to 90 feet. The width of the crack has not changed from March 2, 1999.

The area encompassed by Slough Area #3 has developed numerous small cracks and seeps.

Two new Slough Areas have been identified, Areas 4 and 5. Slough # 4 is approximately 10 feet downslope of Slough #1, and Slough #5 is approximately 10 feet downslope of Slough #4. Slough #4 has a width of 2 inches, and is approximately 70 feet in length. Slough #5 has a maximum width of 4 inches (over 40% of its length) and is approximately 70 feet in length.

There is now evidence of soil bulging at the toe of the slope. There is now evidence of bulging at 30 upslope from the perimeter drainage swale, and the soil and the toe of the slope is nearly overtopping the silt fence.

A Slough Area is developing in the southern half of the repair area. This area is approximately 30 feet upslope of the 24-inch HDPE culvert that was installed during the initial repair work. This Slough is approximately 40 feet in length and is 1/4 - inch in width.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 03/02/1999
WEATHER CONDITIONS: Partly Cloudy 42 Degrees
INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 03/02/1999
WEATHER CONDITIONS: Partly Cloudy 42 Degrees
INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

ADDITIONAL COMMENTS:

As part of the inspection the East Slope Repair Area was monitored.

The section identified as Slough Area #1 (the furthest upslope crack) has increased to 1-inch wide along 50% of its length

The section identified as Slough Area #2 has increased in length from 50 to 70 feet

The crack is now approximately 6 inches wide and 5 inches deep at the center and 3 inches wide and 2 inches deep at the ends.

There is now evidence of soil bulging at the toe of the slope.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 02/02/1999
WEATHER CONDITIONS: Cloudy 39 Degrees
INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Entrance road continues to need additional aggregate.	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas& Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**

TODAY'S DATE: 02/02/1999

WEATHER CONDITIONS: Cloudy 39 Degrees

INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	drainage structures in good condition. Vegetation continues to grow in the rip-rap lined channels	X			

The east slop area continues to move. See attached e-mail and figures.

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 01/26/1999
WEATHER CONDITIONS: Partly cloudy, 37 degrees
INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	No change from previous month	X			
Vent risers	Damaged, plugged or knocked-over	Vents in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Landfill wells in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X			

SITE 5 INSPECTION AND MAINTENANCE LOG
TYPE OF INSPECTION: ☒ **GENERAL** ☐ **DETAILED COVER INSPECTION**
TODAY'S DATE: 01/26/1999
WEATHER CONDITIONS: Partly cloudy, 37 degrees
INSPECTION DONE BY: James R. Faison, Jr.

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X			

ADDITIONAL COMMENTS:

Cracking is developing along the east slope of the landfill north of the previous repair area. A detailed report will be prepared, and photos were taken.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTIONTODAY'S DATE: 02/25/2002WEATHER CONDITIONS: Clear 65INSPECTION DONE BY: Tim Miller

Item	Types of Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
General Site Conditions	Illegal waste disposal on-site, litter, vegetative cover needs mowing, warning signs are damaged	Site in good condition	X			
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas	Access road in good condition	X			
Vent risers	Damaged, plugged or knocked-over	Vents are in good condition	X			
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells	Wells are in good condition	X			
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes	Landfill Cap in good condition	X			
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet	Vegetation in good condition	X		See comment # 2	
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining	Drainage structures in good condition.	X		See Comment # 1.	

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

1. Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time.

Monthly inspection is recommended, but no other actions are necessary at this time.

2. Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections.

Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time.

Fallen trees will be removed if from drainage channel, as necessary.

SITE 5 INSPECTION AND MAINTENANCE LOG

TYPE OF INSPECTION: ☒ GENERAL ☐ DETAILED COVER INSPECTION

TODAY'S DATE: 01/22/2002

WEATHER CONDITIONS: Clear 45

INSPECTION DONE BY: Tim Miller

Item	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
		Yes	No		
General Site Conditions	Illegal waste disposal on-site litter, vegetative cover needs mowing, warning signs are				
Access road	Silt build-up on surface, needs more stone cover, needs restabilization in some areas				
Vent risers	Damaged, plugged or knocked over				
Landfill Gas & Groundwater Monitoring wells	Loose, damaged or rusted casings, broken or missing locks, broken concrete pad, damaged bollards, well ID illegible vegetation obstructing wells				
Landfill cap	Ponding or poor drainage due to settlement, active erosion rills in cover soil, loss of vegetative cover, cracking of cover soil (>3" deep, or 2" wide at surface), sinkholes, depressions, seeps at toe of slopes				
Vegetative Cover	Dead or distressed vegetation, trees, shrubs, or brush growing on capped area, bare spots greater than 10 square feet				
Drainage structures	Undercutting at entry, siltation or vegetation needs to be removed from channel, flow obstructions, cracking or deterioration of RCP, riprap needs more stone cover, grass lined channels eroded, or not draining				

ADDITIONAL COMMENTS:

Refer to sketch for location of ditches.

- Hillside is encroaching into CD-1 approximately 40' from inlet of pipe a distance of 30'. This situation is not restricting the drainage at this time. Monthly inspection is recommended, but no other actions are necessary at this time.
- Noted 14 dead trees at the north end of landfill, outside drainage structure. These trees have shown no life since March 2001 when OMI began landfill inspections. Tree die off likely due to change in drainage characteristics associated with landfill cap installation. No actions recommended at this time. Fallen trees will be removed if from drainage channel, as necessary.

Appendix 4

Documents Reviewed

Documents Reviewed

CH2M HILL, 1996. *Remedial Investigation of the Allegany Ballistics Laboratory, Vol. I and II*. January 1996.

CH2M HILL, 1996. *Phase II Remedial Investigation at the Allegany Ballistics Laboratory Superfund Site, Vol. I and II*. August 1996.

CH2M HILL, 1996. *Focused Feasibility Study for Site 5 Landfill Contents and Surface Soil at Allegany Ballistics Superfund Site*. August 1996.

CH2M HILL, 1997. *Remedial Action Design Landfill Cap, Site 5—Inert Landfill, Allegany Ballistics Laboratory, Mineral County, West Virginia*. March 1997.

CH2M HILL, 1998. *Post Closure Operation and Maintenance Plan and Long-Term Monitoring Plan, Site 5 - Inert Landfill, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. March 1998.

CH2M HILL, 2000. *Draft Annual Long-Term Monitoring Report, Site 5—Inert Landfill, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. May 2000.

ESE, 1983. *Initial Assessment Study, Allegany Ballistics Laboratory*, Environmental Science and Engineering, Inc. January 1983

Kearney, A.T., 1983. *Initial Site Assessment for Allegany Ballistics Laboratory, Mineral County, West Virginia*. January 1983.

OHM Remediation Services Corp., 1997. *Draft Contractors Closeout Report, Landfill Cap Construction, Site 5—Inert Landfill, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. November 1997.

U.S. Environmental Protection Agency, 1997. *Final Record of Decision for Site 5 Landfill Cap and Surface Soil at Allegany Ballistics Laboratory*. February 12, 1997.

U.S. Environmental Protection Agency, 2001. *Comprehensive Five-Year Review Guidance, Office of Emergency and Remedial Response, EPA 540R-01-007*, July 2001.

Weston, Roy F., 1989. *Interim Remedial Investigation for Allegany Ballistics Laboratory, Mineral County, West Virginia, Vol. I - III*. October 1989.

U.S. Department of the Navy, 1998. *Final Draft Federal Facility Agreement for Allegany Ballistics Laboratory*. January 1998.

Appendix 5

Applicable and Relevant and Appropriate Requirements

APPENDIX 5
Applicable or Relevant and Appropriate Requirements
Site 5 Landfill
Allegany Ballistics Laboratory, West Virginia

The following standards were identified as applicable or relevant and appropriate requirements (ARARs) in the Site 5 OU-1 ROD. The five-year review for this site included identification of and evaluation of substantial changes in the ROD-specified ARARs to determine whether such changes may affect the protectiveness of the selected interim remedy.

ARAR or TBC	Regulation	Classification	Requirement Synopsis
I LOCATION SPECIFIC			
Endangered Species Act of 1978	16 USC 1531 50 C. F. R. Part 402	Applicable	Act requires Federal agencies to ensure that any action authorized by an agency is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat.
The Archaeological and Historical Preservation Act of 1974	16 U.S.C 469	Applicable	Requires actions to avoid potential loss or destruction of significant scientific, historical or archaeological data.
Migratory Bird Area	16 USC 1271 Section 703	Applicable	Protects almost all species of native birds in the U. S. from unregulated "take" which can include poisoning at hazardous waste sites.
Wild and Scenic Rivers Act	16 USC 1271 et seq. And section 7(a)	Potentially Applicable	Avoid taking or assisting in action that will have direct adverse effect on scenic rivers.

APPENDIX 5
Applicable or Relevant and Appropriate Requirements
Site 5 Landfill
Allegany Ballistics Laboratory, West Virginia

Hazardous Waste Control Act	40 C. F. R. 264.18 (b)	Potentially Applicable or Relevant and Appropriate to removal and treatment activities	RCRA hazardous waste located within 100-year flood plain; treatment, storage, or disposal of hazardous waste.
Hazardous Waste Control Act	40 C. F. R. 284.18 (b)	Potentially Applicable or Relevant and Appropriate and Appropriate to removal and treatment activities	RCRA hazardous waste located within 100-year flood plain; treatment, storage, or disposal of hazardous waste.
Groundwater Protection Act	47 CSR 58-4.10	Relevant and Appropriate	Facility or activity design must adequately address the issues arising from locating in karst, wetlands, faults, subsidences, delineated wellhead protection areas determined vulnerable.
Executive Order 11988, Protection of Floodplains	40 C.F.R. 6, Appendix A; excluding Sections 6(a)(2), 6(a)(4), 6(a) (6); 40 C.F.R. 6.302	Potentially Applicable	Facilities or activities located within the floodplain must comply with this order.

APPENDIX 5
Applicable or Relevant and Appropriate Requirements
Site 5 Landfill
Allegany Ballistics Laboratory, West Virginia

Executive Order 11990, Protection of Wetlands	40 C.F.R. 6, Appendix A Clean Water Act of 1972 (CWA) Section 404	Applicable	Action to minimize the destruction, loss, or degradation of wetlands.
Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy Act	40 C.F.R. Part 6 Appendix A	Applicable	This is EPA's policy for carrying out the provisions of the Executive Order 11990 (Protection of Wetlands). No activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available. If there is no other practicable alternative, impacts must be mitigated.
II. ACTION SPECIFIC			
Capping/Closure and Post Closure			

APPENDIX 5
Applicable or Relevant and Appropriate Requirements
Site 5 Landfill
Allegany Ballistics Laboratory, West Virginia

Resource Conservation and Recovery Act	40 C.F.R. 265.19	Relevant and Appropriate	Construction Quality Assurance Program.
Resource Conservation and Recovery Act	40 C.F.R. 265.111	Relevant and Appropriate	For a Closing facility, owner must minimize need for further maintenance; control, minimize or eliminate post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and comply with other closure requirements.
Resource Conservation and Recovery Act	40 C.F.R. 265.114	Relevant and Appropriate	During final closure, all contaminated equipment, structures, and soil must be properly disposed of, or decontaminated.
Resource Conservation and Recovery Act	40 C.F.R. 265.115	Relevant and Appropriate	Within 60 days of completion of closure, the owner or operator must submit to the Regional Administrator, by registered mail, a certification that the unit has been closed in accordance with the specifications in the approved closure plan.

APPENDIX 5
Applicable or Relevant and Appropriate Requirements
Site 5 Landfill
Allegany Ballistics Laboratory, West Virginia

Resource Conservation and Recovery Act	40 C.F.R. 265.116	Relevant and Appropriate	No later than the submission of the certification of closure, and owner or operator must submit to the local zoning authority and to the Regional Administrator, a survey plat indicating the location and dimensions of the landfill with respects to permanently surveyed benchmarks.
Resource Conservation and Recovery Act	40 C.F.R. 265.117	Relevant and Appropriate	Post -closure care for each hazardous waste management unit must being after completion of closure and continued for 30 years after that date. It must consist of monitoring and reporting under requirements RCRA Subpart N and maintenance and monitoring of waste containment systems.
Resource Conservation and Recovery Act	40 C.F.R. 265.118	Relevant and Appropriate	The owner or operator must develop a written post-closure plan. The post-closure plan must identify activities to be carried on after closure and the frequency of these activities. The activities include a description of the planned monitoring activities and frequencies to be performed; a description of the planned maintenance activities and frequencies to be performed to ensure the integrity of the cap and final cover and the function of the monitoring equipment. The post-closure plan must also include the name, address, and phone number of the person to contact during the post-closure care period.

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Resource Conservation and Recovery Act	40 C.F.R. 265.119	Relevant and Appropriate	The owner or operator must, within 60 days after certification of closure of each hazardous waste disposal unit, submit to the local zoning authority and to the Regional Administrator a record of the type , location, and quantity of hazardous waste disposed of within the disposal unit. The owner or operator must record a notation on the deed to the facility property that will perpetuity notify any potential purchaser of the property that the land has been used to manage hazardous waste, its use is restricted under 40 C.F.R. Subpart G regulations and that a survey plat is included. The owner or operator must submit a certification that he has recorded the notation on the deed.
Resource Conservation and Recovery Act	40 C.F.R. 265.120	Relevant and Appropriate	The owner or operator, within 60 days after completion of the post closure care period, must submit to the Regional Administrator, by registered mail, a certification that the post-closure care period was performed in accordance with the specifications in the approved post-closure plan.

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Resource Conservation and Recovery Act	40 C.F.R 265.310	Relevant and Appropriate	Final Cover to provide long-term minimization of infiltration. Restrict post-closure use of property to prevent damage to the cover. Prevent run-on and run-off from damaging the cap. 30-year post-closure care to ensure site is maintained and monitored.
Solid Waste Management Act	Originally 47 CSR 38-6 to 7. Currently transferred to WVDEP - Office of Water Resources Title 33 series)	Relevant and Appropriate	Permanent Closure Criteria governing: Access Restriction, Deed Notation, Closure and Post Closure Care, Gas Management, Drainage Layer, Final Cover, Run-on Run-off Controls, Maintenance of Leachate Control, Site Monitoring, and compiling with other permanent closure requirements.
AIR			
Gas Collection and Vents	CAA Section 101 and 40 CFR 52	Relevant and Appropriate	File an Air Pollution Emission Notice (APEN) with the State to include estimation of emission rates for each pollutant expected. Design system to provide an odor-free operation.
Gas Collection and Vents	40 C.F.R 52	Applicable	Predict total emission of volatile organic compounds (COCs) to demonstrate emissions do not exceed 450 lb/hr, 3,000 lb/day, 10 gal/day or allowable emission levels from similar sources using Reasonably Available Control Technology (RACT).

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Gas Collection and Vents	40 C.F.R 60 Subpart WWW and CC	To Be Considered	New Source Performance Standards (NSPS): Landfill Emission Rule deals with non-methane organic compounds.
Gas Collection and Vents	40 C.F.R. 61	Relevant and Appropriate	Verify that emissions of mercury, vinyl chloride , and benzene do not exceed levels expected from sources in compliance with hazardous air pollution regulations.
Gas Collection and Vents	CAA Section 112D	Relevant and Appropriate	Emission Standards for new stationary sources.
Gas Collection and Vents	CAA Section 118	Applicable	Control of pollution from Federal Facilities.
Air Pollution Control Act and the Hazardous Waste Management Act	45CSR25-4.3	Relevant and Appropriate	Facility design, construction, maintain, and operate in a manner to minimized hazardous waste constituents to the air.
Air Pollution Control Act	45CSR27-4.1 thru 4.2	Applicable	Best Available Technology requirements for Fugitive Emissions of Toxic Air Pollutants.
Air Pollution Control Act	45CSR30	Applicable	Requirements for the air quality permitting system.
WATER			

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Criteria for Classification of Solid Waste Disposal Facilities and Practices	49 C.F.R 257.3-3(a)	Potentially Applicable	A facility shall not cause a discharge of pollutants into the waters of the U. S. that is in violation of the substantive requirements of the NPDES under CWA Section 402, as amended.
Criteria for Classification of Solid Waste Disposal Facilities and Practices	49 C.F.R 257.3-3(a)	Potentially Applicable	A facility or practice shall not cause non-point source pollution of the waters of the U. S. that violates applicable legal substantive requirements implementing an area-wide or Statewide water quality management plan approved by the Administrator under CWA Section 208, as amended.
Criteria for Classification of Solid Waste Disposal Facilities and Practices	49 C.F.R 257.3-4 and Appendix I	Potentially Applicable	A facility or practice shall not contaminate an underground drinking water source beyond the solid waste boundary or a court- or State-established alternative.
Groundwater Protection Act	46CSR12-3.1 thru 3.3 plus Appendix A; 47CSR58-1 to 47CSR58-12	Relevant and Appropriate	This establishes the minimum standards of water purity and quality for groundwater located in the state.
Groundwater Protection Act	47CSR58-4.2	Relevant and Appropriate	Subsurface bores of all types shall be constructed, operated and closed in a manner which protects groundwater.

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Groundwater Protection Act	47CSR58-4.9.4 to 4.9.7	Applicable	Groundwater monitoring stations shall be located and constructed in a manner that allows accurate determination of groundwater quality and levels, and prevents contamination of groundwater through the finished well hole or casing. All groundwater monitoring stations shall be accurately located utilizing latitude and longitude by surveying, or other acceptable means, and coordinates shall be included with all data collected.
Groundwater Protection Act	47 CSR 60 – 1 to 23	Applicable	Monitoring well design Standards.
Water Pollution Control Act	46 CSR 1-1 to 9	Relevant and Appropriate	Rules establishing, governing discharge of waste into State waters.
Groundwater Protection Act	47 CSR59-4.1 to 4.7	Relevant and Appropriate	Monitoring well Drillers certification.
Miscellaneous			
Resource Conservation and Recovery Act	40 CFR 262.10 (a), 262.11	Applicable	Waste generator shall determine if that waste is hazardous waste.
Resource Conservation and Recovery Act	40 CFR 262.34	Potentially Applicable	Generator may accumulate waste onsite for 90 days or less or must comply with requirements for operating a storage facility.

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Resource Conservation and Recovery Act	40 CFR 262.171, 172, 173	Potentially Applicable	Containers of RCRA hazardous waste must be: <ul style="list-style-type: none"> - Maintained in good condition. - Compatible with hazardous waste to be stored. - Closed during storage except to add or remove wastes.
Resource Conservation and Recovery Act	40 CFR 264.174	Potentially Applicable	Inspect container storage areas weekly for deterioration.
Resource Conservation and Recovery Act	40 CFR 264.175(a) and (b)	Potentially Applicable	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment systems with a Capacity of 10 percent of the volume of containers of free liquid. Removed spilled or leaked waste in a timely manner to prevent overflow of the containment system.
Resource Conservation and Recovery Act	40 C.F.R. 264.176	Potentially Applicable	Keep containers of ignitable or reactive waste at least 50 feet from the facility property line.
Resource Conservation and Recovery Act	40 C.F.R. 264.177	Potentially Applicable	Keep incompatible materials separate. Separate incompatible materials stored near each other by a dike or other barrier.
Resource Conservation and Recovery Act	40 C.F.R. 264.178	Potentially Applicable	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers, liners.

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Resource Conservation and Recovery Act	40 C.F.R. 268.40	Potentially Applicable	Movements of excavated materials to new location and placement in or on land will trigger land disposal restrictions for the excavated waste or closure requirements for the unit in which the waste is being placed.
Resource Conservation and Recovery Act	40 C.F.R. 264.251 (except 251(j), 251(e)(11))	Potentially Applicable	Use single liner and leachate collection system. Waste put into waste pile subject to land band regulation.
Resource Conservation and Recovery Act	40 C.F.R. 268.40	Potentially Applicable	Attain land disposal treatment standards before putting waste into landfill in order to comply with ban restrictions.
U. S. Department of Transportation	49 C.F.R. 171.2(f)	Potentially Applicable	No person shall represent that a container or package is safe unless it meets the requirements of 49 USC 1802, et seq. Or represent that a hazardous material is present in a package or motor vehicle if it is not.
U. S. Department of Transportation	49 C.F.R. 171.2 (g)	Potentially Applicable	No person shall unlawfully alter or deface labels, placards, or descriptions, packages, containers, or motor vehicles used for transportation of hazardous materials.
U. S. Department of Transportation	49 C.F.R. 171.300	Potentially Applicable	Each person who offers hazardous material for transportation or each carrier that transports it shall mark each package, container, and vehicle in the manner required.

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U.S. Department of Transportation	49 C.F.R 171.301	Potentially Applicable	Each person offering non-bulk hazardous materials for transportation shall mark the proper shipping name and identification number (technical name) and consignee's name and address.
U.S. Department of Transportation	49 C.F.R 171.302	Potentially Applicable	Hazardous materials for transportation in bulk packages must be labeled with proper identification (ID) number, specific in 49 CFR 172.101 table, with required size of print. Packages must remain marked until cleaned or refilled with material requiring other marking.
U.S. Department of Transportation	49 C.F.R 171.303	Potentially Applicable	No package marked with proper shipping name or ID number may be offered for transport or transported unless the package contains the identified hazardous material or its residue.
U.S. Department of Transportation	49 C.F.R 171.304	Potentially Applicable	The marking must be durable, in English, in contrasting colors, un-obscured, and away from other markings.
U.S. Department of Transportation	49 C.F.R 171.400	Potentially Applicable	Labeling of hazardous material packages shall be as specified in the list.
U.S. Department of Transportation	49 C.F.R 171.312	Potentially Applicable	Non-bulk combination packages containing liquid hazardous materials must be packed with closures upward, and marked with arrows pointing upward.
U.S. Department of Transportation	49 C.F.R 171.504	Potentially Applicable	Each bulk packaging or transport vehicle containing any quantity of hazardous material must be placarded on each side and each end with the type of placard listed in Table 1 and 2 of 49 CFR 172.504.

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Two additional action-specific ARAR was identified during the 5-year review as described below.

1. Requirements under the State of West Virginia Solid Waste Management Rule 33 CSR 1, as promulgated by to West Virginia Code 22-15-1, et seq.
2. Amendment to requirements under 40 CFR 118, dated October 22, 1998.

It is important to note that the selected remedy must comply with Federal and State ARARs for impermeable covers, performance standards, and component standards for closed sanitary landfills with the exception of Maximum Contaminant Levels (MCLs), which will be addressed in the final ROD for OU-2.

At present, Federal and State standards for the contaminants of concern have not changed in a manner that affects the protectiveness of the remedy since the signing of the ROD in 1997. Federal standards have not changed substantially in a manner that would impact protectiveness of the selected remedy. Although State of West Virginia regulations for methane emissions have changed since remedy selection for OU-1 and there has been an amendment to 40 CFR 118, these changes do not affect the protectiveness of the selected remedy for the site.

Action-specific requirements governing actions such as the construction of landfills have not changed substantially since the signing of the ROD. The Resource Conservation and Recovery Act (RCRA) calls for these requirements. Location-specific ARARs include both Federal and State regulations to protect endangered species and the Archaeological Historic Preservation Act of 1974. In addition, both Federal and State regulations regarding the protection of floodplains and wetlands are considered location-specific ARARs. There have been no substantial changes in Federal or State regulations that would affect protectiveness.

Appendix 6

Long-Term Monitoring Data

1
Site 5 Alluvial H Wells Detected Constituents
Allegany Health Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	AS05-5GW01-R01	AS05-5GW01-R02	AS05-5GW01-R03	AS05-5GW01-R04	AS05-5GW01-R05	AS05-5GW01P-R05	AS05-5GW01-R06
Sample ID									
Sample Date			05/05/98	10/12/98	01/19/99	10/21/99	08/08/00	08/08/00	04/10/01
Chemical Name									
Volatile Organic Compounds (UG/L)									
1,1,1-Trichloroethane	200	320	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane (total)	70	5.5	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	—	100	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U
Ethane	—	—	NA	NA	NA	NA	NA	NA	4
Ethene	—	—	NA	NA	NA	NA	NA	NA	4
Methane	—	—	NA	NA	NA	NA	NA	NA	20
Methylene chloride	5	4.1	0.6 B	0.6 J	2 U	1 U	1.6 B	1.6 B	1.9 B
Trichloroethene	5	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	2	0.04	0.4 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	1 U	1 U	NA	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)									
No Detections									
Pesticide/Polychlorinated Biphenyls (UG/L)									
No Detections									
Herbicides (UG/L)									
No Detections									
Explosives (UG/L)									
No Detections									
Total Metals (UG/L)									
Aluminum	—	3,700	NA	51,100	51,100	37,600	68,900	61,000	NA
Antimony	6	1.5	3.1 J	2.7 B	3 U	5 U	4.9 U	4.9 U	NA
Arsenic	50	0.045	2.3 UL	31.9	41.5	11.2	60.9	52.9	NA
Barium	2,000	260	34.6 B	258	322	506	432	442	NA
Beryllium	4	7.3	0.61 U	3 B	4.5 B	5.3	5.4	5.5	NA
Boron	—	330	NA	NA	NA	50 U	NA	NA	NA
Calcium	—	—	NA	21,700	38,100	52,800	49,000	52,600	NA
Chromium	100	11	20.5 B	185	102	197	122	111	NA
Cobalt	—	220	15.6 K	32.8 B	32.7 B	61.8	53.6	54.3	NA
Copper	1,300	150	5.5 U	68.2	113	119	113	114	NA
Cyanide	200	73	NA	NA	4 U	5 U	10 U	10 U	10 U
Iron	—	2,200	NA	78,400	130,000	67,400	142,000 J	137,000 J	NA
Lead*	15	15	6.1 B	72.7	105	146	138	138	NA
Magnesium	—	—	NA	8,320	11,300	11,800	14,200	13,900	NA
Manganese	—	73	NA	571	658	1,150	977	1,010	NA
Mercury	2	1.1	0.16 B	0.13 U	0.2 U	0.44	0.1 U	0.1 U	NA
Nickel	—	73	12.7 J	146	88.9	164	118	114	NA
Potassium	—	—	NA	8,020	6,090	5,730	9,280 J	7,970 J	NA
Silver	—	18	2.8 UL	2.1 B	2 U	2.8 B	0.6 U	0.6 U	NA
Sodium	—	—	NA	2,730 B	3,950 B	4,170 BE	1,800 B	2,480 B	NA
Thallium	2	0.26	2.6 J	15.5	3 U	7 U	13.2 B	14.4 B	NA
Tin	—	2,200	28.3 U	NA	NA	NA	NA	NA	NA
Vanadium	—	26	8.4 B	97.8	111	79.2	146	137	NA
Zinc	—	1,100	33.6 B	277	446	336	524	512	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

Site 5 Alluvial
Detected Constituents
Allegany Chemicals Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	AS05-5GW01-R01	AS05-5GW01-R02	AS05-5GW01-R03	AS05-5GW01-R04	AS05-5GW01-R05	AS05-5GW01P-R05	AS05-5GW01-R06
Sample ID									
Sample Date			05/05/98	10/12/98	01/19/99	10/21/99	08/08/00	08/08/00	04/10/01
Chemical Name									
Dissolved Metals (UG/L)									
Aluminum	--	3,700	NA	2,740	41 B	34 B	19.2 U	19.2 U	99,800
Antimony	6	1.5	NA	1.9 U	3 U	5 U	4.9 U	4.9 U	5.5 J
Arsenic	50	0.05	NA	3.6 U	4 U	6 U	3.8 U	3.8 U	81.1
Barium	2,000	260	NA	14.7 B	15.1 B	16.4 B	16.3 J	16.1 J	675
Beryllium	4	7.3	NA	0.91 U	1 U	1 U	0.1 U	0.1 U	8
Boron	--	330	NA	NA	NA	50 U	NA	NA	50.2
Cadmium	5	1.8	NA	0.59 U	1 U	1 U	0.4 U	0.4 UL	0.4 U
Calcium	--	--	NA	12,200	22,400	25,500	31,000	31,400	48,800
Chromium	100	11	NA	40.6	1.3 B	1 U	0.7 U	0.7 U	206
Cobalt	--	220	NA	5 U	1 U	1 U	1.1 U	1.1 U	77.4
Copper	1,300	150	NA	9.9 B	15.8 B	8.9 B	0.7 UL	0.7 U	183
Iron	--	2,200	NA	549	99.1 B	16 U	15.9 U	15.9 U	201,000
Lead	15	15	NA	2.2 U	1 U	2 U	2 U	2 U	203
Magnesium	--	--	NA	1,750 B	3,140 B	3,430 B	4,270 J	4,200 J	17,400
Manganese	--	73	NA	42.1	3.2 B	3.5 B	0.94 B	1.1 B	1,290
Mercury	2	1.1	NA	0.13 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 UL
Molybdenum	--	18	NA	NA	NA	50 U	NA	NA	10.3 J
Nickel	--	73	NA	55	2.6 B	9.8 B	2 U	3 B	174
Potassium	--	--	NA	889 B	860 B	855 B	1,150 J	923 J	11,900
Selenium	50	18	NA	2.9 U	4 U	5 U	2.2 UL	2.2 U	15.3
Silver	--	18	NA	2 B	2 U	1.8 B	0.6 U	0.78 B	7.1 J
Sodium	--	--	NA	2,690 B	2,700 B	2,680 BE	1,500 J	2,170 B	2,270 J
Thallium	2	0.26	NA	2.8 U	3 U	7 U	2.3 UL	2.3 U	10.9 B
Vanadium	--	26	NA	5.3 U	1 U	2 U	1 U	1.3 B	192
Zinc	--	1,100	NA	14.4 B	27.4	5.2 B	9.1 J	4.9 B	802 J
Wet Chemistry (MG/L)									
Alkalinity	--	--	31.8	37.9	30	64	94	90	74
Ammonia	--	0.021	0.22	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	NA	6.1
Bicarbonate	--	--	31.8	37.9	2 U	63	94	90	74
Biological oxygen demand	--	--	2 U	2 U	3	15	82	2 U	NA
Chemical oxygen demand	--	--	5 U	5 U	5 U	5 U	230	9	14
Chloride	--	--	2.4	1.9	5 U	5 U	1.2	1.1	2.2
Hardness	--	--	NA	NA	141	175	180	190	190
Methane	--	--	NA	NA	NA	NA	1.00E-03 U	1.00E-03 U	NA
Nitrate	10	5.8	NA	NA	0.543	1.05	0.93	1.5	NA
Nitrate/Nitrite	10	--	1.63	1.46	NA	NA	NA	NA	1.6
Nitrite	1	0.37	NA	NA	0.05 U	0.05 U	0.36	0.05 U	NA
pH	--	--	NA	5.67	6.13	5.82	5.67	5.67	NA
Oil and Grease	--	--	1.2	1 U	NA	NA	NA	NA	NA
Sulfate	--	--	5 U	5 U	1 U	59.1	40	3	8
Total dissolved solids (TDS)	--	--	90	166	82	90	94	92	160 L
Total organic carbon (TOC)	--	--	3.6	5.7	10 U	100 U	1 U	1 U	1.9
Total recoverable phenolics	--	--	NA	NA	50 U	0.05 U	0.03 U	0.03 U	0.025 U
Reactivity (MG/L)									
No Detections									

Exceeds one or more criteria
* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial Aquifer Wells Detected Constituents
Allegheny Geomatics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW07					
			AS05-5GW07-R01	AS05-5GW07-R02	AS05-5GW07-R03	AS05-5GW07-R04	AS05-5GW07-R05	AS05-5GW07-R06
			05/05/98	10/13/98	01/20/99	10/22/99	08/07/00	04/11/01
Sample ID								
Sample Date								
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	200	320	10 UJ	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	10 UJ	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane (total)	70	5.5	10 UJ	NA	NA	NA	NA	NA
Carbon disulfide	--	100	10 UJ	1 U	1 U	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	NA	NA	4 U
Ethene	--	--	NA	NA	NA	NA	NA	4 U
Methane	--	--	NA	NA	NA	NA	NA	12
Methylene chloride	5	4.1	10 UJ	1 BJ	2 U	1.3 JB	0.7 B	0.6 B
Trichloroethene	5	1.6	10 UJ	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	2	0.04	10 UJ	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)								
No Detections								
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections								
Herbicides (UG/L)								
No Detections								
Explosives (UG/L)								
No Detections								
Total Metals (UG/L)								
Aluminum	--	3,700	444 B	879	4,500	49.3 B	22.6 B	NA
Antimony	6	1.5	2.3 U	1.9 U	3 U	5 U	4.9 U	NA
Arsenic	50	0.045	2.3 UL	3.6 U	7.4 B	6 U	4.3 B	NA
Barium	2,000	260	75.4 J	83.3 B	117 B	62.1 B	63.6 J	NA
Beryllium	4	7.3	0.61 U	0.91 U	1 U	1 U	0.1 U	NA
Boron	--	330	NA	NA	NA	50 U	NA	NA
Calcium	--	--	43,600	42,700	42,900	40,300	47,000	NA
Chromium	100	11	6.6 U	6.1 U	9.6 B	1 U	0.96 B	NA
Cobalt	--	220	36.9 J	31.2 B	32.3 B	27.1 B	31.5 J	NA
Copper	1,300	150	5.5 U	5.4 B	36.8	20.4 B	4 B	NA
Cyanide	200	73	NA	NA	4 U	5 U	10 U	10 U
Iron	--	2,200	16,900	14,900	27,400	9,740	10,600 J	NA
Lead*	15	15	3.2 B	2.3 B	5.5	2 U	5.4 B	NA
Magnesium	--	--	19,300	20,100	20,600	18,000	21,300	NA
Manganese	--	73	1,050	996	855	831	1,030	NA
Mercury	2	1.1	0.13 UL	0.13 U	0.2 U	0.2 U	0.1 U	NA
Nickel	--	73	81.4	90.8	89.9	72.3	84.4	NA
Potassium	--	--	2,650 J	2,820 B	3,450 B	2,100 B	2,730 J	NA
Silver	--	18	4.9 L	3.2 B	2 U	1 U	0.6 U	NA
Sodium	--	--	18,900 J	18,800	19,800	14,400	16,500	NA
Thallium	2	0.26	1.7 J	2.8 U	3 U	7 U	2.3 UL	NA
Tin	--	2,200	NA	NA	NA	NA	NA	NA
Vanadium	--	26	5.8 U	5.3 U	9.7 B	2 U	1 U	NA
Zinc	--	1,100	99.5	118	195	105	121	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

11
Site 5 Alluvial Aquifer Wells Detected Constituents
Alegany Bailistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW07					
			AS05-5GW07-R01	AS05-5GW07-R02	AS05-5GW07-R03	AS05-5GW07-R04	AS05-5GW07-R05	AS05-5GW07-R06
			05/06/98	10/13/98	01/20/99	10/22/99	08/07/00	04/11/01
Sample ID								
Sample Date								
Chemical Name								
Dissolved Metals (UG/L)								
Aluminum	—	3,700	151 B	43.3 U	32.7 B	52 B	19.2 U	70.3 B
Antimony	6	1.5	2.3 U	2.4 B	3 U	5 U	4.9 U	3.1 U
Arsenic	50	0.05	2.3 UL	3.6 U	4 U	6 U	7.6 B	3.5 B
Barium	2,000	260	65.7 J	66.1 B	66 B	68.9 B	63.3 J	74 B
Beryllium	4	7.3	0.61 U	0.91 U	1 U	1 U	0.1 U	0.36 B
Boron	—	330	NA	NA	NA	NA	NA	98.1
Cadmium	5	1.8	0.88 B	0.59 U	1 U	1 U	0.4 U	0.6 B
Calcium	—	—	39,800	41,200	44,800	45,100	49,700	51,200
Chromium	100	11	6.6 U	6.1 U	1 U	1 U	0.7 U	0.8 U
Cobalt	—	220	35.6 B	29.7 B	27.3 B	30.6 B	33.5 J	37.2 J
Copper	1,300	150	5.5 U	7.8 B	18.8 B	31.9	0.7 UL	2.7 J
Iron	—	2,200	10,100 J	11,400	11,700	10,700	10,600	12,100
Lead	15	15	18.2 J	2.2 U	1 U	2 U	2 U	2.5 U
Magnesium	—	—	18,400	19,100	20,700	20,000	22,200	23,500
Manganese	—	73	942	944	853	927	1,080	1,100
Mercury	2	1.1	0.13 UL	0.13 U	0.2 U	0.2 U	0.1 U	1 B
Molybdenum	—	18	NA	NA	NA	NA	NA	10 U
Nickel	—	73	81.5	83.1	76.9	81.8	88.6	95.3
Potassium	—	—	2,470 J	2,630 B	2,430 B	2,510 B	3,850 J	3,250 J
Selenium	50	18	3.6 U	2.9 U	4 U	5 U	2.2 UL	3.2 U
Silver	—	18	5.3 L	3.4 B	2 U	1 U	0.6 U	1.3 U
Sodium	—	—	17,900	18,000	21,200	18,200	18,800	19,300
Thallium	2	0.26	1.7 U	5.1 B	3 U	7 U	2.3 UL	3.9 U
Vanadium	—	26	5.8 U	5.3 U	1 U	2 U	1 U	34.9 U
Zinc	—	1,100	113 B	112	120	109	105	139 B
Wet Chemistry (MG/L)								
Alkalinity	—	—	43.5	48	50	59	85	65
Ammonia	—	0.021	0.1 U	2.03	0.1 U	0.1 U	0.2 U	0.37
BOD-5day (total)	—	—	NA	NA	NA	NA	NA	8.6
Bicarbonate	—	—	43.5	48	2 U	58.9	85	65
Biological oxygen demand	—	—	2 U	2 U	0.6	3.18	2 U	NA
Chemical oxygen demand	—	—	5 U	5 U	5 U	5 U	5 U	50
Chloride	—	—	34.4	32.9	33.7	NA	30	29
Hardness	—	—	NA	NA	194	174	210	225
Methane	—	—	NA	NA	NA	NA	0.0128	NA
Nitrate	10	5.8	NA	NA	0.153	0.1	0.5 U	NA
Nitrate/Nitrite	10	—	0.05 U	0.05 U	NA	NA	NA	0.55 U
Nitrite	1	0.37	NA	NA	0.05 U	0.05 U	0.05 U	NA
pH	—	—	NA	5.62	5.68	5.48	5.46	NA
Oil and Grease	—	—	1.2	1 U	NA	NA	NA	NA
Sulfate	—	—	142	140	162	82.7	150	190
Total dissolved solids (TDS)	—	—	290	330	280	260	NA	300
Total organic carbon (TOC)	—	—	2.3	6.3	10 U	100 U	1 U	1.7
Total recoverable phenolics	—	—	NA	NA	50 U	0.05 U	0.03 U	0.029
Reactivity (MG/L)								
No Detections								

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial N. J Wells Detected Constituents
Allegany Biomixics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW09					
Sample ID			AS05-5GW09-R01	AS05-5GW09-R02	AS05-5GW09-R03	AS05-5GW09-R04	AS05-5GW09-R05	AS05-5GW09-R06
Sample Date			05/06/98	10/14/98	01/21/99	10/22/99	08/03/00	04/17/01
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	200	320	10 U	1 U	1 U	1 U	0.5 J	1 U
1,2-Dichloroethane	5	0.12	10 U	0.6 J	1 U	1 U	1 U	1 U
1,2-Dichloroethane (total)	70	5.5	NA	NA	NA	NA	NA	NA
Carbon disulfide	—	100	10 U	1	1 U	1 U	1 UJ	1 U
Ethane	—	—	NA	NA	NA	NA	NA	4 U
Ethene	—	—	NA	NA	NA	NA	NA	4 U
Methane	—	—	NA	NA	NA	NA	NA	144
Methylene chloride	5	4.1	1 B	1 BJ	2 U	1 U	1.2 B	2 U
Trichloroethene	5	1.6	65 J	46	NA	52	48	46
Vinyl chloride	2	0.04	4 U	1 U	1 U	1 U	1 UJ	1 U
cis-1,2-Dichloroethene	70	6.1	NA	5	3.1	NA	7.1	4
Semi-volatile Organic Compounds (UG/L)								
No Detections								
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections								
Herbicides (UG/L)								
No Detections								
Explosives (UG/L)								
No Detections								
Total Metals (UG/L)								
Aluminum	—	3,700	NA	23,800	996	42.4 B	136 B	NA
Antimony	6	1.5	2.3 U	2.9 B	3 U	5 U	4.9 U	NA
Arsenic	50	0.045	2.3 UL	14.1	4 U	6 U	4.1 B	NA
Barium	2,000	260	38.8 J	823	152 B	40.7 B	32.8 J	NA
Beryllium	4	7.3	0.61 U	2 B	1 U	1 U	0.1 U	NA
Boron	—	330	NA	NA	NA	53.2	83.6	NA
Calcium	—	—	NA	45,600	39,300	67,000	90,700	NA
Chromium	100	11	10.6 B	59.9	13.1	1 U	0.7 UL	NA
Cobalt	—	220	18.1 B	20.5 B	9.9 B	6.9 B	8.8 J	NA
Copper	1,300	150	5.5 U	38.9	13.7 B	19.1 B	0.7 U	NA
Cyanide	200	73	NA	NA	4 U	5 U	10 U	19
Iron	—	2,200	NA	64,000	3,570	163	562	NA
Lead*	15	15	5.1 B	29.4	1.9 B	2 U	2 U	NA
Magnesium	—	—	NA	19,400	14,400	23,500	32,400	NA
Manganese	—	73	NA	1,550	1,510	1,780	1,990	NA
Mercury	2	1.1	0.13 UL	0.13 U	0.2 U	0.2 U	0.1 U	NA
Nickel	—	73	33.2 J	70.3	30.8 B	33.9 B	23.6 J	NA
Potassium	—	—	NA	5,250	2,190 B	2,770 B	3,980 K	NA
Silver	—	18	2.8 UL	4.8 B	2 U	1 U	0.6 UL	NA
Sodium	—	—	NA	11,900	11,700	16,900	16,700	NA
Thallium	2	0.26	1.7 U	11.4	3 U	7 U	2.3 U	NA
Tin	—	2,200	48.7 B	NA	NA	NA	NA	NA
Vanadium	—	26	6.5 B	50.7	3.3 B	2 U	1 U	NA
Zinc	—	1,100	28.1 B	153	50.7	53.2	39 B	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial Material Wells Detected Constituents
Allegheny Biomass Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW09					
			AS05-5GW09-R01	AS05-5GW09-R02	AS05-5GW09-R03	AS05-5GW09-R04	AS05-5GW09-R05	AS05-5GW09-R06
			05/06/98	10/14/98	01/21/99	10/22/99	08/03/00	04/17/01
Sample ID								
Sample Date								
Chemical Name								
Dissolved Metals (UG/L)								
Aluminum	—	3,700	NA	43.3 U	26.8 B	39.1 B	92 B	79.6 B
Antimony	6	1.5	NA	1.9 U	3 U	5 U	4.9 U	3.1 U
Arsenic	50	0.05	NA	3.6 U	4 U	6 U	4.1 B	2.5 U
Barium	2,000	260	NA	43.2 B	65.8 B	40.2 B	35.1 J	33.4 J
Beryllium	4	7.3	NA	0.91 U	1 U	1 U	0.1 U	0.1 U
Boron	—	330	NA	NA	NA	NA	57.5	112
Cadmium	5	1.8	NA	0.59 U	1 U	1 U	0.4 U	0.4 U
Calcium	—	—	NA	52,500	48,900	69,900	96,100	122,000
Chromium	100	11	NA	6.1 U	1.2 B	1 U	0.7 U	0.8 U
Cobalt	—	220	NA	5 U	10.4 B	7.4 B	8.9 J	5.3 J
Copper	1,300	150	NA	13.7 B	14.2 B	11.2 B	0.7 UL	1.7 J
Iron	—	2,200	NA	317	621	105	461	464
Lead	15	15	NA	2.2 U	1 U	2 U	4.2 B	2.5 U
Magnesium	—	—	NA	18,700	18,900	24,100	30,800	36,300
Manganese	—	73	NA	1,470	1,640	1,790	2,110	1,990
Mercury	2	1.1	NA	0.13 U	0.2 U	0.2 U	0.1 U	0.2 U
Molybdenum	—	18	NA	NA	NA	NA	10 U	10 U
Nickel	—	73	NA	29.2 B	26.8 B	34.8 B	29.1 J	24.1 J
Potassium	—	—	NA	2,820 B	2,990 B	2,810 B	4,050 J	4,550 J
Selenium	50	18	NA	2.9 U	4 U	5 U	16.3 B	3.2 U
Silver	—	18	NA	2.3 B	2 U	1 U	1.3 B	1.3 U
Sodium	—	—	NA	13,800	14,400	17,100	17,600 J	19,500 J
Thallium	2	0.26	NA	3.8 B	3 U	7 U	2.3 U	3.9 U
Vanadium	—	26	NA	5.3 U	2 B	2 U	1 U	34.9 U
Zinc	—	1,100	NA	40.2	50.3	47.3	33.3 B	46.7 J
Wet Chemistry (MG/L)								
Alkalinity	—	—	136	65.8	70	64	120	170
Ammonia	—	0.021	0.14	0.1 U	0.1 U	0.1 U	0.22	0.2 U
BOD-5day (total)	—	—	NA	NA	NA	NA	NA	2 U
Bicarbonate	—	—	136	65.8	2 U	63.9	120	170
Biological oxygen demand	—	—	2 U	2 U	0.2 U	3.06	2 U	NA
Chemical oxygen demand	—	—	5 U	8.5	5 U	5 U	5	38
Chloride	—	—	16.7	27.6	31.9	28.3	24	35
Hardness	—	—	NA	NA	156	266	360	454
Methane	—	—	NA	NA	NA	NA	0.0639 U	NA
Nitrate	10	5.8	NA	NA	0.05 U	0.1	0.74	NA
Nitrate/Nitrite	10	—	0.77	0.05 U	NA	NA	NA	1.4
Nitrite	1	0.37	NA	NA	0.05 U	0.05 U	0.05 U	NA
pH	—	—	NA	5.52	5.63	5.32	5.46	NA
Oil and Grease	—	—	1 U	1 U	NA	NA	NA	NA
Sulfate	—	—	181	91	124	108	210	360
Total dissolved solids (TDS)	—	—	445	288	253	310	370	630
Total organic carbon (TOC)	—	—	3.1	13.7	10 U	100 U	2.4	2.5
Total recoverable phenolics	—	—	NA	NA	50 U	0.05 U	0.03 U	0.025 U
Reactivity (MG/L)								
No Detections								

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial M. Wells Detected Constituents
Allegany Basistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW11			
Sample ID			AS05-5GW11P-R01	AS05-5GW11-R01	AS05-5GW11-R05	AS05-5GW11-R06
Sample Date			05/05/98	05/05/98	08/02/00	04/11/01
Chemical Name						
Volatile Organic Compounds (UG/L)						
1,1,1-Trichloroethane	200	320	1 UJ	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	1 UJ	1 U	1 U	1 U
1,2-Dichloroethene (total)	70	5.5	NA	NA	NA	NA
Carbon disulfide	--	100	1 UJ	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	4 U
Ethene	--	--	NA	NA	NA	4 U
Methane	--	--	NA	NA	NA	2 U
Methylene chloride	5	4.1	1 B	0.9 B	2 U	0.5 B
Trichloroethene	5	1.6	1 UJ	1 U	1 U	1 U
Vinyl chloride	2	0.04	0.4 UJ	0.4 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	NA	1 U	1 U
Semi-volatile Organic Compounds (UG/L)						
No Detections						
Pesticide/Polychlorinated Biphenyls (UG/L)						
No Detections						
Herbicides (UG/L)						
No Detections						
Explosives (UG/L)						
No Detections						
Total Metals (UG/L)						
Aluminum	--	3,700	NA	NA	83.7 B	NA
Antimony	6	1.5	2.3 U	2.3 U	4.9 U	NA
Arsenic	50	0.045	2.3 UL	2.3 UL	3.8 U	NA
Barium	2,000	260	161 J	51.3 J	25.4 J	NA
Beryllium	4	7.3	0.61 U	0.61 U	0.1 U	NA
Boron	--	330	NA	NA	50 R	NA
Calcium	--	--	NA	NA	33,300	NA
Chromium	100	11	6.6 U	7.1 B	0.7 UL	NA
Cobalt	--	220	5.7 U	8.8 K	8.3 J	NA
Copper	1,300	150	5.5 U	5.5 U	13.6 L	NA
Cyanide	200	73	NA	NA	10 U	10 U
Iron	--	2,200	NA	NA	15.9 U	NA
Lead*	15	15	11.8 B	4.7 B	2 U	NA
Magnesium	--	--	NA	NA	13,600	NA
Manganese	--	73	NA	NA	214	NA
Mercury	2	1.1	0.13 UL	0.13 UL	0.14 B	NA
Nickel	--	73	6.8 U	14.3 J	36.6 J	NA
Potassium	--	--	NA	NA	1,920 J	NA
Silver	--	18	2.8 UL	3.6 L	0.6 UL	NA
Sodium	--	--	NA	NA	7,190	NA
Thallium	2	0.26	1.8 J	2.1 J	2.3 UL	NA
Tin	--	2,200	68.1 B	28.3 U	NA	NA
Vanadium	--	26	5.8 U	5.8 U	1 U	NA
Zinc	--	1,100	17.6 B	25.9 B	133	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial N. Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW11			
Sample ID			AS05-5GW11P-R01	AS05-5GW11-R01	AS05-5GW11-R05	AS05-5GW11-R06
Sample Date			05/05/98	05/05/98	08/02/00	04/11/01
Chemical Name						
Dissolved Metals (UG/L)						
Aluminum	--	3,700	NA	NA	NA	110 B
Antimony	6	1.5	NA	NA	NA	3.4 J
Arsenic	50	0.05	NA	NA	NA	2.9 B
Barium	2,000	260	NA	NA	NA	38.7 J
Beryllium	4	7.3	NA	NA	NA	0.43 B
Boron	--	330	NA	NA	NA	71
Cadmium	5	1.8	NA	NA	NA	0.73 B
Calcium	--	--	NA	NA	NA	40,800
Chromium	100	11	NA	NA	NA	0.8 U
Cobalt	--	220	NA	NA	NA	5 J
Copper	1,300	150	NA	NA	NA	8.9 J
Iron	--	2,200	NA	NA	NA	298
Lead	15	15	NA	NA	NA	2.5 U
Magnesium	--	--	NA	NA	NA	13,400
Manganese	--	73	NA	NA	NA	43.8
Mercury	2	1.1	NA	NA	NA	0.2 UL
Molybdenum	--	18	NA	NA	NA	10 U
Nickel	--	73	NA	NA	NA	11.6 J
Potassium	--	--	NA	NA	NA	2,270 J
Selenium	50	18	NA	NA	NA	3.2 U
Silver	--	18	NA	NA	NA	1.3 U
Sodium	--	--	NA	NA	NA	13,000
Thallium	2	0.26	NA	NA	NA	6 B
Vanadium	--	26	NA	NA	NA	34.9 U
Zinc	--	1,100	NA	NA	NA	77.1 B
Wet Chemistry (MG/L)						
Alkalinity	--	--	214	84.1	52	89
Ammonia	--	0.021	0.1 U	0.1 U	0.2 U	0.2 U
BOD-5day (total)	--	--	NA	NA	NA	9.3
Bicarbonate	--	--	214	84.1	52	88
Biological oxygen demand	--	--	2 U	2 U	NA	NA
Chemical oxygen demand	--	--	5 U	5.6	5 U	40
Chloride	--	--	6.2	15	6	5.5
Hardness	--	--	NA	NA	140	157
Methane	--	--	NA	NA	NA	NA
Nitrate	10	5.8	NA	NA	0.83	NA
Nitrate/Nitrite	10	--	0.05 U	4.29	NA	1.4
Nitrite	1	0.37	NA	NA	NA	NA
pH	--	--	NA	NA	4.8	NA
Oil and Grease	--	--	1 U	1.1	NA	NA
Sulfate	--	--	20.6	192	110	98
Total dissolved solids (TDS)	--	--	261	380	180	270
Total organic carbon (TOC)	--	--	2.5	4.9	2.5	3.9
Total recoverable phenolics	--	--	NA	NA	0.025 U	0.025 U
Reactivity (MG/L)						
No Detections						

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

11
Site 5 Alluvial and Shallow Wells Detected Constituents
Allegany Geosciences Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW13							
Sample ID			AS05-5GW13-R01	AS05-5GW13P-R02	AS05-5GW13-R02	AS05-5GW13-R03	AS05-5GW13P-R03	AS05-5GW13-R04	AS05-5GW13-R05	AS05-5GW13-R06
Sample Date			05/07/98	10/14/98	01/21/99	01/21/99	01/21/99	10/22/99	08/09/00	04/18/01
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1,1-Trichloroethane	200	320	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane (total)	70	5.5	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	--	100	1 UJ	0.7 J	1	1 U	1 U	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	NA	NA	NA	NA	4 U
Ethene	--	--	NA	NA	NA	NA	NA	NA	NA	4 U
Methane	--	--	NA	NA	NA	NA	NA	NA	NA	2 U
Methylene chloride	5	4.1	1 UJ	1 BJ	1 BJ	2 U	2 U	1 U	3.6	4.1 B
Trichloroethene	5	1.6	67 J	26 B	40	43 D	37 D	61 D	81	62
Vinyl chloride	2	0.04	0.4 UJ	1 U	0.6 J	1 U	1 U	1 U	0.6 J	1 U
cis-1,2-Dichloroethene	70	6.1	NA	4	5	3	3.5	NA	5.2	3.2
Semi-volatile Organic Compounds (UG/L)										
No Detections										
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Herbicides (UG/L)										
No Detections										
Explosives (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	--	3,700	NA	478	255	196 B	141 B	54.1 B	29.3 B	NA
Antimony	6	1.5	2.3 U	1.9 U	1.9 U	3 U	3 U	5 U	4.9 B	NA
Arsenic	50	0.045	2.3 UL	4.8 B	5.4 B	4 U	4 U	6 U	3.8 U	NA
Barium	2,000	260	32.8 B	35.4 B	42.6 B	30.6 B	32.8 B	28.5 B	21.7 J	NA
Beryllium	4	7.3	0.8 B	0.91 U	0.91 U	1 U	1 U	1 U	0.12 B	NA
Boron	--	330	NA	NA	NA	NA	NA	50 U	59.2	NA
Calcium	--	--	NA	140,000	132,000	98,300	110,000	149,000	196,000	NA
Chromium	100	11	8 J	6.1 U	6.1 U	1.3 B	1 U	1 U	6.2 B	NA
Cobalt	--	220	18.1 B	10.3 B	9.3 B	4.7 B	5.4 B	6.7 B	8.8 K	NA
Copper	1,300	150	5.5 U	8.2 B	5.9 B	9.1 B	9.9 B	25.1	3.2 B	NA
Cyanide	200	73	NA	NA	NA	4 U	4 U	5 U	10 U	100
Iron	--	2,200	NA	3,640	3,240	3,000	3,280	3,320	920 J	NA
Lead*	15	15	12.4 B	2.2 U	2.2 U	1 U	1 U	2 U	2 U	NA
Magnesium	--	--	NA	24,600	23,200	14,500	16,100	25,800	42,800	NA
Manganese	--	73	NA	1,270	1,200	693	823	1,430	4,510	NA
Mercury	2	1.1	0.13 UL	0.13 U	0.13 U	0.2 U	0.2 U	0.2 U	0.1 U	NA
Nickel	--	73	40.1	31.5 B	28.5 B	23.1 B	25.8 B	31.3 B	31.7 K	NA
Potassium	--	--	NA	1,390 B	1,020 B	955 B	1,070 B	1,290 B	1,890 J	NA
Silver	--	18	4.4 B	3.1 B	2.6 B	2 U	2 U	1 U	0.82 B	NA
Sodium	--	--	NA	12,200	11,300	10,800	12,200	13,900	14,600	NA
Thallium	2	0.26	1.7 U	4.9 B	3.1 B	3 U	3 U	7 U	2.3 UL	NA
Tin	--	2,200	65.5 J	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	26	5.8 U	6.4 B	5.3 U	1 U	1 U	2 U	1 U	NA
Zinc	--	1,100	89.9 B	84.8	72.1	70.5	67.2	78.9	50.7	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial Monitoring Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW13							
			AS05-5GW13-R01	AS05-5GW13P-R02	AS05-5GW13-R02	AS05-5GW13-R03	AS05-5GW13P-R03	AS05-5GW13-R04	AS05-5GW13-R05	AS05-5GW13-R06
Sample ID			05/07/98	10/14/98	01/21/99	01/21/99	01/21/99	10/22/99	08/09/00	04/18/01
Sample Date										
Chemical Name										
Dissolved Metals (UG/L)										
Aluminum	--	3,700	NA	3,130	43.3 U	23.9 B	19.9 B	54 B	19.2 U	47.8 J
Antimony	6	1.5	NA	1.9 U	1.9 U	3 U	3 U	5 U	4.9 U	3.1 U
Arsenic	50	0.05	NA	3.6 U	3.6 U	4 U	4 U	6 U	4.9 B	2.5 U
Barium	2,000	260	NA	23.8 B	25.5 B	29.2 B	33.4 B	29.4 B	20.6 J	23.7 J
Beryllium	4	7.3	NA	0.91 U	0.91 U	1 U	1 U	1 U	0.1 U	0.12 J
Boron	--	330	NA	NA	NA	NA	NA	NA	50 U	50 U
Cadmium	5	1.8	NA	0.59 U	0.59 U	1 U	1 U	1 U	0.4 UL	1.5 J
Calcium	--	--	NA	138,000	138,000	116,000	135,000	162,000	189,000	237,000
Chromium	100	11	NA	6.1 U	6.1 U	1 U	1 U	1 U	1.6 B	0.8 U
Cobalt	--	220	NA	8.4 B	9.3 B	5.6 B	6.1 B	6.2 B	9.1 K	14.2 J
Copper	1,300	150	NA	12.8 B	7.1 B	10.3 B	7.7 B	19.1 B	1.2 B	2.3 J
Iron	--	2,200	NA	3,410	3,310	3,110	3,550	3,590	1,350	1,130
Lead	15	15	NA	2.2 U	2.2 U	1 U	1 U	2 U	2.9 K	2.5 U
Magnesium	--	--	NA	23,400	23,800	17,300	20,000	28,100	39,400	54,300
Manganese	--	73	NA	1,290	1,280	825	950	1,550	4,050	8,030
Mercury	2	1.1	NA	0.13 U	0.13 U	0.2 U	0.2 U	0.2 U	0.13 B	0.2 U
Molybdenum	--	18	NA	NA	NA	NA	NA	NA	10 U	10 U
Nickel	--	73	NA	39.2 B	28.5 B	26.2 B	29 B	32.3 B	29.5 K	32 J
Potassium	--	--	NA	1,190 B	1,250 B	1,160 B	1,380 B	1,390 B	1,990 J	2,460 J
Selenium	50	18	NA	2.9 U	2.9 U	4 U	4 U	5 U	8.3 B	3.2 U
Silver	--	18	NA	2.3 B	3.6 B	2 U	2 U	1 U	0.64 B	1.3 U
Sodium	--	--	NA	11,800	11,900	14,200	16,500	14,900	16,200	20,000
Thallium	2	0.26	NA	5.1 B	4.7 B	3 U	3 U	7 U	2.3 U	3.9 U
Vanadium	--	26	NA	5.3 U	5.3 U	1 U	1 U	2 U	1 U	34.9 U
Zinc	--	1,100	NA	67.1	64.2	72.9	77.4	86.6	38.7	56.3
Wet Chemistry (MG/L)										
Alkalinity	--	--	222	238	219	228	238	218	260	210
Ammonia	--	0.021	0.1 U	0.14	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	NA	NA	2 U
Bicarbonate	--	--	222	238	219	2 U	2 U	217	260	210
Biological oxygen demand	--	--	5.3	2 U	2 U	0.2 U	0.2 U	2.04	2 U	NA
Chemical oxygen demand	--	--	5 U	6.6	6.3	5 U	5 U	5 U	5 U	12
Chloride	--	--	22.7	30.1	30.1	26.6	31.9	33.6	35	42
Hardness	--	--	NA	NA	NA	304	342	478	670	810
Methane	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	5.8	NA	NA	NA	0.05 U	0.05 U	0.08	0.5 U	NA
Nitrate/Nitrite	10	--	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	0.55 U
Nitrite	1	0.37	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA
pH	--	--	NA	6.08	6.08	6.43	6.43	5.88	5.85	NA
Oil and Grease	--	--	3	1 U	1 U	NA	NA	NA	NA	NA
Sulfate	--	--	309	187	184	171	190	82.7	NA	800
Total dissolved solids (TDS)	--	--	708	528	525	416	427	510	590	1,100
Total organic carbon (TOC)	--	--	3.4	38.8	173	10 U	10 U	100 U	3	3.2
Total recoverable phenolics	--	--	NA	NA	NA	50 U	50 U	611	0.03 U	0.031
Reactivity (MG/L)										
No Detections										

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

11
Site 5 Alluvial Monitoring Wells Exceedances
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID Sample ID Sample Date	MCL- Groundwater	Tap Water Adjusted RBC	5GW17							
			AS05-5GW17-R01 03/07/98	AS05-5GW17-R02 10/15/98	AS05-5GW17-R03 01/21/99	AS05-5GW17-R04 10/25/99	AS05-5GW17P-R04 10/25/99	AS05-5GW17-R05 08/10/00	AS05-5GW17P-R05 08/10/00	AS05-5GW17-R06 04/06/01
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1,1-Trichloroethane	200	320	10 U	1 U	1 U	1 U	NA	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	10 U	1 U	1 U	1 U	NA	1 U	1 U	1 U
1,2-Dichloroethene (total)	70	5.5	10 U	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	--	100	10 U	1	1 U	1 U	NA	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	NA	NA	NA	NA	4 U
Ethene	--	--	NA	NA	NA	NA	NA	NA	NA	4 U
Methane	--	--	NA	NA	NA	NA	NA	NA	NA	2 U
Methylene chloride	5	4.1	10 U	0.6 BJ	2 U	2 U	NA	2 UJ	2 UJ	0.6 B
Trichloroethene	5	1.6	23	11 B	19	17	NA	10	11	17
Vinyl chloride	2	0.04	10 U	1 U	1 U	1 U	NA	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	2	1.7	1.3	NA	1.3	1.3	0.9 J
Semi-volatile Organic Compounds (UG/L)										
No Detections										
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Herbicides (UG/L)										
No Detections										
Explosives (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	--	3,700	9,860	23,300	3,780	546	NA	412	348	NA
Antimony	6	1.5	2.3 U	1.9 U	3 U	5 U	NA	4.9 U	4.9 U	NA
Arsenic	50	0.045	7.8 B	10.5	4 U	6 U	NA	3.8 U	3.8 U	NA
Barium	2,000	260	365	563	316	85 B	NA	99.8 J	87.7 J	NA
Beryllium	4	7.3	0.97 B	1.5 B	1 U	1 U	NA	0.1 U	0.1 U	NA
Boron	--	330	NA	NA	NA	50 U	NA	50 U	50 U	NA
Calcium	--	--	51,400	58,800	48,400	56,700	NA	58,700	60,600	NA
Chromium	100	11	17.8 K	31.2	8.8 B	1 U	NA	7.1 J	6.4 B	NA
Cobalt	--	220	12 J	21.5 B	4.1 B	1 U	NA	4 B	3.5 B	NA
Copper	1,300	150	14.2 B	55.2	19.9 B	25.7 E	NA	1.5 B	2.2 B	NA
Cyanide	200	73	NA	NA	4 U	5 U	NA	10 U	10 U	10 U
Iron	--	2,200	11,700	31,200	7,180	962	NA	786 J	609 J	NA
Lead*	15	15	8.6 B	12.1	4.6	7.8	NA	2 U	2 U	NA
Magnesium	--	--	14,200	17,900	12,500	14,400	NA	15,100	15,600	NA
Manganese	--	73	540	901	457	411	NA	579	597	NA
Mercury	2	1.1	0.7	0.18 B	0.2 U	0.2 U	NA	0.1 U	0.1 U	NA
Nickel	--	73	25.9 K	49.9	16.6 B	9 B	NA	16 J	15.3 J	NA
Potassium	--	--	2,920 J	4,300 B	1,250 B	863 B	NA	926 J	902 J	NA
Silver	--	18	2.8 UL	8.6 B	2 U	1 U	NA	0.6 U	0.96 B	NA
Sodium	--	--	8,910	10,300	9,620	10,500 E	NA	7,630	7,970	NA
Thallium	2	0.26	5 B	9.1 B	3 U	7 U	NA	2.3 UL	2.3 UL	NA
Tin	--	2,200	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	26	22.2 J	40.5 B	6.1 B	2 U	NA	1 U	1 U	NA
Zinc	--	1,100	64 B	139	51.3	33.2	NA	28.6	30.6	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial M. g Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW17							
Sample ID			AS05-5GW17-R01	AS05-5GW17-R02	AS05-5GW17-R03	AS05-5GW17-R04	AS05-5GW17P-R04	AS05-5GW17-R05	AS05-5GW17P-R05	AS05-5GW17-R06
Sample Date			03/07/98	10/15/98	01/21/99	10/25/99	10/25/99	08/10/00	08/10/00	04/06/01
Chemical Name										
Dissolved Metals (UG/L)										
Aluminum	--	3,700	83.7 B	66.3 B	30.9 B	NA	62.1 B	19.2 U	19.2 U	50.8 B
Antimony	6	1.5	5 J	1.9 U	3 U	NA	5 U	4.9 U	4.9 U	3.1 U
Arsenic	50	0.05	4.4 B	4.7 B	4 U	NA	6 U	3.8 U	3.8 U	3.4 B
Barium	2,000	260	63.9 J	62 B	53.8 B	NA	184 B	67.9 J	67.3 J	57.1 J
Beryllium	4	7.3	0.61 U	0.91 U	1 U	NA	1 U	0.1 U	0.1 U	0.33 B
Boron	--	330	NA	NA	NA	NA	NA	50 U	50 U	50 U
Cadmium	5	1.8	0.27 U	0.59 U	1 U	NA	1 U	0.4 UL	0.4 UL	0.65 B
Calcium	--	--	55,800	55,500	49,600	NA	59,000	64,100	63,700	71,000
Chromium	100	11	6.6 UL	6.1 U	1 U	NA	1 U	2.3 B	2.7 B	0.8 U
Cobalt	--	220	5.7 U	5 U	1 U	NA	1 U	2.9 B	3.3 B	1.8 J
Copper	1,300	150	5.5 U	18.2 B	13.5 B	NA	32.4 E	0.7 U	0.7 U	0.8 U
Iron	--	2,200	124 B	30.1 B	60.3 B	NA	7,310	15.9 U	15.9 U	46.2 J
Lead	15	15	2.2 B	2.2 U	1.2 B	NA	3.2	2 U	2 U	2.5 U
Magnesium	--	--	14,400	14,700	12,600	NA	8,550	16,400	16,200	19,500
Manganese	--	73	393	443	356	NA	432	636	644	502
Mercury	2	1.1	0.13 U	0.13 U	0.2 U	NA	1.3	0.1 U	0.17 B	0.2 UL
Molybdenum	--	18	NA	NA	NA	NA	NA	10 U	10 U	10 U
Nickel	--	73	6.8 U	8.8 U	5.8 B	NA	2 U	11.7 K	11.8 K	12.1 K
Potassium	--	--	760 J	636 B	716 B	NA	577 B	913 J	928 J	885 B
Selenium	50	18	3.6 U	2.9 U	4 U	NA	5 U	4.4 B	4.5 B	3.2 U
Silver	--	18	2.8 UL	2.6 B	2 U	NA	1 U	0.6 U	0.7 B	1.3 U
Sodium	--	--	9,610	10,200	10,900	NA	7,470 E	8,600	8,780	10,100
Thallium	2	0.26	1.7 U	2.8 U	3 U	NA	7 U	2.3 UL	2.3 UL	5.2 K
Vanadium	--	26	5.8 U	5.3 U	1.2 B	NA	2 U	1 U	1 U	34.9 U
Zinc	--	1,100	24.8 B	25.4	28.1	NA	27.2	16.2 J	16.9 J	40.3 B
Wet Chemistry (MG/L)										
Alkalinity	--	--	68.8	74.9	80	62	NA	98	99	69
Ammonia	--	0.021	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.2 U	0.2 U	0.2 U
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	NA	NA	2 U
Bicarbonate	--	--	68.8	74.9	2 U	61.9	NA	98	99	69
Biological oxygen demand	--	--	2 U	2 U	0.2 U	4.26	NA	2 U	2.6	NA
Chemical oxygen demand	--	--	5 U	18.9	5 U	5 U	NA	5 U	5 U	26
Chloride	--	--	19.7	19.2	33.7	17.7	NA	20	20	14
Hardness	--	--	NA	NA	171	201	NA	210	220	258
Methane	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	5.8	NA	NA	0.05 U	0.05 U	NA	0.5 U	0.5 U	NA
Nitrate/Nitrite	10	--	1.12	0.62	NA	NA	NA	NA	NA	0.55 U
Nitrite	1	0.37	NA	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA
pH	--	--	NA	5.69	5.83	5.6	5.6	5.4	5.4	NA
Oil and Grease	--	--	1.7	1 U	NA	NA	NA	NA	NA	NA
Sulfate	--	--	135	115	82.3	88.6	NA	130	120	180
Total dissolved solids (TDS)	--	--	344	334	237	230	NA	250	240	360
Total organic carbon (TOC)	--	--	2.4	8.3	10 U	100 U	NA	1.1	1.1	27
Total recoverable phenolics	--	--	NA	NA	50 U	50 U	NA	0.03 U	0.03 U	0.025 U
Reactivity (MG/L)										
No Detections										

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial Wells Detected Constituents
Allegany Geology Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW18							
Sample ID			AS05-5GW18-R01	AS05-5GW18-R02	AS05-5GW18-R03	AS05-5GW18-R04	AS05-5GW18P-R04	AS05-5GW18-R05	AS05-5GW18-R06	AS05-5GW18P-R06
Sample Date			03/07/98	10/15/98	01/21/99	10/25/99	10/25/99	08/10/00	04/19/01	04/19/01
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1,1-Trichloroethane	200	320	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene (total)	70	5.5	7	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	--	100	10 U	1	1 U	1 U	1 U	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	NA	NA	NA	4 U	4 U
Ethene	--	--	NA	NA	NA	NA	NA	NA	4 U	4 U
Methane	--	--	NA	NA	NA	NA	NA	NA	20 U	20 U
Methylene chloride	5	4.1	10 U	1 BJ	2 U	2 U	2 U	2 U	2 U	2 U
Trichloroethene	5	1.6	41	70	NA	19	20	77	48	46
Vinyl chloride	2	0.04	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	17	14	3	3.2	9.9	11	9.6
Semi-volatile Organic Compounds (UG/L)										
No Detections										
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Herbicides (UG/L)										
No Detections										
Explosives (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	--	3,700	343	339	421	307	362	19.2 U	NA	NA
Antimony	6	1.5	2.3 U	1.9 U	3 U	5 U	5 U	4.9 B	NA	NA
Arsenic	50	0.045	2.3 UL	3.6 U	4 U	6 U	6 U	5.5 B	NA	NA
Barium	2,000	260	93.6 J	194 B	292	250	234	36 J	NA	NA
Beryllium	4	7.3	0.61 U	0.91 U	1 U	1 U	1 U	0.1 U	NA	NA
Boron	--	330	NA	NA	NA	50 U	50 U	50 U	NA	NA
Calcium	--	--	83,700	78,500	70,200	60,900	58,500	111,000	NA	NA
Chromium	100	11	6.6 U	6.1 U	1.5 B	3.4 B	5.1 B	5.2 B	NA	NA
Cobalt	--	220	5.7 U	5 U	1 U	1 U	1 U	1.1 U	NA	NA
Copper	1,300	150	5.5 U	5 U	14.5 B	32.4 E	41.3 E	1.7 B	NA	NA
Cyanide	200	73	NA	NA	4 U	5 U	5 U	10 U	11	11
Iron	--	2,200	4,430 J	6,380	14,100	11,900	12,100	1,470 J	NA	NA
Lead*	15	15	15 B	2.2 U	3.6	90.6	20.3	2 U	NA	NA
Magnesium	--	--	11,000	11,500	9,510	8,860	8,500	15,600	NA	NA
Manganese	--	73	548	632	726	483	444	91.8	NA	NA
Mercury	2	1.1	0.17 UL	0.13 U	0.2 U	0.2 U	0.2 U	0.1 U	NA	NA
Nickel	--	73	6.8 U	8.8 U	2.8 B	4.2 B	5.4 B	10.5 J	NA	NA
Potassium	--	--	858 J	570 B	710 B	589 B	636 B	468 J	NA	NA
Silver	--	18	2.8 UL	2.9 B	2 U	1 U	1 U	0.92 B	NA	NA
Sodium	--	--	8,100 J	7,370	7,960	7,560 E	7,290 E	9,640	NA	NA
Thallium	2	0.26	1.7 U	3.3 B	3 U	7 U	7 U	2.3 UL	NA	NA
Tin	--	2,200	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	26	5.8 U	5.3 U	1.4 B	2 U	2 U	1 U	NA	NA
Zinc	--	1,100	21.9 B	12.9 B	27.3	59.6	44.3	30.6	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial Wells Detected Constituents
Allegany Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW18							
Sample ID			AS05-5GW18-R01	AS05-5GW18-R02	AS05-5GW18-R03	AS05-5GW18-R04	AS05-5GW18P-R04	AS05-5GW18-R05	AS05-5GW18-R06	AS05-5GW18P-R06
Sample Date			03/07/98	10/15/98	01/21/99	10/25/99	10/25/99	08/10/00	04/19/01	04/19/01
Chemical Name										
Dissolved Metals (UG/L)										
Aluminum	--	3,700	48.1 B	415	22.5 B	NA	35 B	19.2 U	34.3 B	48 B
Antimony	6	1.5	4 J	1.9 U	3 U	NA	5 U	4.9 U	3.1 U	3.1 U
Arsenic	50	0.05	2.3 UL	3.6 U	4 U	NA	6 U	4.1 B	2.5 U	2.5 U
Barium	2,000	260	93.6 J	159 B	273	NA	66 B	33.3 J	26.8 B	25.1 B
Beryllium	4	7.3	0.61 U	0.91 U	1 U	NA	1 U	0.1 U	0.73 B	0.72 J
Boron	--	330	NA	NA	NA	NA	NA	50 U	50 R	50 R
Cadmium	5	1.8	0.64 B	0.59 U	1 U	NA	1 U	0.4 UL	0.4 U	0.4 U
Calcium	--	--	90,900	90,600	82,300	NA	57,600	122,000	110,000	106,000
Chromium	100	11	6.6 U	6.1 U	1 U	NA	1 U	2.7 B	0.8 U	0.8 U
Cobalt	--	220	5.7 B	5 U	1 U	NA	1 U	1.1 U	1 U	1.3 B
Copper	1,300	150	5.5 U	7.2 B	8.5 B	NA	19.2 BE	0.7 U	0.8 U	3.1 J
Iron	--	2,200	3,570 J	4,410	8,940	NA	16 U	495	1,740	1,690
Lead	15	15	10.1 B	2.2 U	1 U	NA	2 U	2 U	2.5 U	2.5 U
Magnesium	--	--	12,300	13,400	11,200	NA	14,600	17,100	15,900	15,200
Manganese	--	73	592	714	967	NA	412	99.7	394	371
Mercury	2	1.1	0.17 UL	0.13 U	0.2 U	0.2 U	0.2 U	0.1 U	0.2 U	0.2 U
Molybdenum	--	18	NA	NA	NA	NA	NA	10 U	10 R	10 R
Nickel	--	73	7.9 J	8.8 U	1.3 B	NA	7 B	6.4 B	3.3 B	1.7 U
Potassium	--	--	640 B	355 B	682 B	NA	753 B	578 J	504 J	457 J
Selenium	50	18	3.6 U	2.9 U	4 U	NA	5 U	2.2 U	3.2 U	3.2 U
Silver	--	18	2.8 UL	4.2 B	2 U	NA	1 U	0.79 B	1.3 U	1.3 U
Sodium	--	--	8,700	8,340	9,620	NA	10,500 E	11,700	10,700	10,200
Thallium	2	0.26	1.7 U	4.7 B	3 U	NA	7 U	2.3 UL	3.9 U	3.9 U
Vanadium	--	26	5.8 U	5.3 U	1 U	NA	2 U	1 U	34.9 U	34.9 U
Zinc	--	1,100	17.7 B	21	26.5	NA	22.1	17.3 J	61 R	26.7 R
Wet Chemistry (MG/L)										
Alkalinity	--	--	139	157	168	128	128	120	130	130
Ammonia	--	0.021	0.13	0.42	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	NA	2 U	2
Bicarbonate	--	--	139	157	2 U	127	127	120	130	130
Biological oxygen demand	--	--	8.7	2 U	0.2 U	4.74	4.92	2 U	NA	NA
Chemical oxygen demand	--	--	11.6	6	5 U	5 U	5 U	5 U	23	18
Chloride	--	--	9.2	9.6	12.4	5 U	5 U	21	16	16
Hardness	--	--	NA	NA	213	186	179	340	340	330
Methane	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	5.8	NA	NA	0.05 U	0.05 U	0.25	0.5 U	NA	NA
Nitrate/Nitrite	10	--	0.18	0.14	NA	NA	NA	NA	0.55 U	0.55 U
Nitrite	1	0.37	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
pH	--	--	NA	6.38	6.63	6.66	6.66	5.83	NA	NA
Oil and Grease	--	--	3	1 U	NA	NA	NA	NA	NA	NA
Sulfate	--	--	140	64.8	86.9	27.6	47.3	250	200	220
Total dissolved solids (TDS)	--	--	332	280	261	210	210	370	390	380
Total organic carbon (TOC)	--	--	2.5	31.9	10 U	100 U	100 U	1.3	1.2	1.2
Total recoverable phenolics	--	--	NA	NA	50 U	50 U	643	0.03 U	0.025 U	0.025 U
Reactivity (MG/L)										
No Detections										

Exceeds one or more criteria
* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial Spring Wells Detected Constituents
Allegany Geomatics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW19		5GW20	
Sample ID			AS05-5GW19-R05	AS05-5GW19-R06	AS05-5GW20-R05	AS05-5GW20-R06
Sample Date			08/09/00	04/05/01	08/09/00	04/04/01
Chemical Name						
Volatile Organic Compounds (UG/L)						
1,1,1-Trichloroethane	200	320	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	1 U	1 U	1 U	1 U
1,2-Dichloroethane (total)	70	5.5	NA	NA	NA	NA
Carbon disulfide	--	100	1 U	1 U	1 U	1 U
Ethane	--	--	NA	4 U	NA	4 U
Ethene	--	--	NA	4 U	NA	4 U
Methane	--	--	NA	2 U	NA	2 U
Methylene chloride	5	4.1	4.1	0.7 B	3.6	0.6 B
Trichloroethene	5	1.6	1 U	1 U	3.8	14
Vinyl chloride	2	0.04	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	1 U	1 U	0.7 J	0.9 J
Semi-volatile Organic Compounds (UG/L)						
No Detections						
Pesticide/Polychlorinated Biphenyls (UG/L)						
No Detections						
Herbicides (UG/L)						
No Detections						
Explosives (UG/L)						
No Detections						
Total Metals (UG/L)						
Aluminum	--	3,700	16,300	NA	7,090	NA
Antimony	6	1.5	4.9 U	NA	5.7 B	NA
Arsenic	50	0.045	7.4 B	NA	4.8 B	NA
Barium	2,000	260	366	NA	185 J	NA
Beryllium	4	7.3	1.1 J	NA	0.54 J	NA
Boron	--	330	50 U	NA	50 U	NA
Calcium	--	--	31,400	NA	42,900	NA
Chromium	100	11	33.8	NA	15.9	NA
Cobalt	--	220	41.4 J	NA	15.2 J	NA
Copper	1,300	150	37.2	NA	15 J	NA
Cyanide	200	73	10 U	1	10 U	1
Iron	--	2,200	28,500 J	NA	14,500 J	NA
Lead*	15	15	29.9	NA	10.2	NA
Magnesium	--	--	8,710	NA	10,200	NA
Manganese	--	73	2,900	NA	672	NA
Mercury	2	1.1	0.21 B	NA	0.1 U	NA
Nickel	--	73	61.2	NA	27.2 J	NA
Potassium	--	--	2,840 J	NA	2,160 J	NA
Silver	--	18	0.84 B	NA	0.6 U	NA
Sodium	--	--	3,470 B	NA	4,480 B	NA
Thallium	2	0.26	2.3 UL	NA	2.3 UL	NA
Tin	--	2,200	NA	NA	NA	NA
Vanadium	--	26	32.9 J	NA	12.4 J	NA
Zinc	--	1,100	150	NA	72.4	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

Site 5 Alluvial and Wells Detected Constituents
 Allegany Geomatics Laboratory
 Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW19		5GW20	
Sample ID			AS05-5GW19-R05	AS05-5GW19-R06	AS05-5GW20-R05	AS05-5GW20-R06
Sample Date			08/09/00	04/05/01	08/09/00	04/04/01
Chemical Name						
Dissolved Metals (UG/L)						
Aluminum	—	3,700	19.2 U	58.1 B	19.2 U	259
Antimony	6	1.5	6.2 B	3.1 U	4.9 U	3.1 U
Arsenic	50	0.05	3.8 U	3.4 K	3.8 U	2.6 K
Barium	2,000	260	75.6 J	78.5 J	82.9 J	92.6 J
Beryllium	4	7.3	0.1 U	0.21 B	0.1 U	0.26 B
Boron	—	330	50 U	50 U	50 U	50 U
Cadmium	5	1.8	0.4 UL	0.4 U	0.4 UL	0.58 B
Calcium	—	—	26,900	29,200	38,200	51,000
Chromium	100	11	1.7 B	0.8 U	2.2 B	4.6 J
Cobalt	—	220	1.1 B	1 U	1.8 B	1
Copper	1,300	150	0.7 U	1.8 J	0.7 U	4.7 B
Iron	—	2,200	15.9 U	41.5 J	15.9 U	455
Lead	15	15	2 U	2.5 U	2 U	2.5 U
Magnesium	—	—	5,600	5,990	8,480	6,680
Manganese	—	73	117	13.4 J	46.6	29.7
Mercury	2	1.1	0.1 U	0.2 UL	0.1 U	0.2 UL
Molybdenum	—	18	10 U	10 U	10 U	10 U
Nickel	—	73	8.3 B	2.4 J	6.2 B	6.1 J
Potassium	—	—	637 J	585 J	853 J	388 J
Selenium	50	18	2.2 U	3.2 U	2.2 U	3.2 U
Silver	—	18	0.6 U	1.3 U	0.6 U	1.3 U
Sodium	—	—	3,940 B	3,540 J	5,320	5,170
Thallium	2	0.26	2.3 UL	5.8 K	2.3 U	4.7 K
Vanadium	—	26	1.1 B	34.9 U	1 U	34.9 U
Zinc	—	1,100	14.5 B	35 B	11.3 B	34 B
Wet Chemistry (MG/L)						
Alkalinity	—	—	43	45	74	63
Ammonia	—	0.021	0.2 U	0.2 U	0.2 U	0.2 U
BOD-5day (total)	—	—	NA	2 U	NA	2 U
Bicarbonate	—	—	43	45	74	63
Biological oxygen demand	—	—	2 U	NA	3.9	NA
Chemical oxygen demand	—	—	5 U	56	5 U	30
Chloride	—	—	4	3.5	12	7.7
Hardness	—	—	110	100	150	160
Methane	—	—	NA	NA	NA	NA
Nitrate	10	5.8	0.58	NA	0.51	NA
Nitrate/Nitrite	10	—	NA	0.88	NA	0.61
Nitrite	1	0.37	0.05	NA	0.05 U	NA
pH	—	—	5.28	NA	5.48	NA
Oil and Grease	—	—	NA	NA	NA	NA
Sulfate	—	—	NA	51	NA	110
Total dissolved solids (TDS)	—	—	100	170 L	150	200 L
Total organic carbon (TOC)	—	—	1 U	10	1 U	1 U
Total recoverable phenolics	—	—	0.03 U	0.025 U	0.03 U	0.025 U
Reactivity (MG/L)						
No Detections						

Exceeds one or more criteria
 * Screening value listed for lead is action level in groundwater

NA - Not analyzed
 B - Analyte not detected above associated blank
 D - Result came from a diluted sample
 E - Estimated - Interference

J - Reported value is estimated
 K - Biased high
 L - Biased low

1
Site 5 Alluvial Wells Detected Constituents
Allegany Geomatics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW21		5GW22		5GW23		5GW24	
Sample ID			AS05-5GW21-R05	AS05-5GW21-R06	AS05-5GW22-R05	AS05-5GW22-R06	AS05-5GW23-R05	AS05-5GW23-R06	AS05-5GW24-R05	AS05-5GW24-R06
Sample Date			08/08/00	04/04/01	08/08/00	04/19/01	08/08/00	04/04/01	08/07/00	04/09/01
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1,1-Trichloroethane	200	320	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	0.12	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane (total)	70	5.5	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	--	100	1 UJ	1 U	1 UJ	1 U	1 UJ	1 U	2.1 B	1 U
Ethane	--	--	NA	4 U	NA	4 U	NA	4 U	NA	4
Ethene	--	--	NA	4 U	NA	4 U	NA	4 U	NA	4
Methane	--	--	NA	2 U	NA	2 U	NA	2 U	NA	20
Methylene chloride	5	4.1	1.9 B	0.6 B	1.6 B	2 U	1.8 B	0.7 B	0.6 B	1.8 B
Trichloroethene	5	1.6	1 U	1 U	82	96	4.2	3.9	1 U	1 U
Vinyl chloride	2	0.04	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	1 U	1 U	13	14	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)										
No Detections										
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Herbicides (UG/L)										
No Detections										
Explosives (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	--	3,700	1,930	NA	6,060	NA	1,070	NA	94.1 B	NA
Antimony	6	1.5	4.9 U	NA	4.9 U	NA	4.9 U	NA	4.9 U	NA
Arsenic	50	0.045	6.4 B	NA	3.8 U	NA	3.8 U	NA	5 B	NA
Barium	2,000	260	117 J	NA	233	NA	346	NA	72.3 J	NA
Beryllium	4	7.3	0.24 B	NA	0.5 B	NA	0.1 B	NA	0.11 B	NA
Boron	--	330	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	--	--	55,000	NA	44,800	NA	58,400	NA	124,000	NA
Chromium	100	11	6.3 B	NA	12.2 B	NA	5.1 B	NA	0.96 B	NA
Cobalt	--	220	2.5 B	NA	27 J	NA	2.8 B	NA	1.1 U	NA
Copper	1,300	150	7.7 B	NA	7.5 B	NA	3.2 B	NA	3.3 B	NA
Cyanide	200	73	10 U	1	10 U	11	10 U	1	10 U	10 U
Iron	--	2,200	6,030 J	NA	11,900 J	NA	4,590 J	NA	405 J	NA
Lead*	15	15	4.9 B	NA	14	NA	6.2 B	NA	2.1 B	NA
Magnesium	--	--	6,970	NA	7,030	NA	6,860	NA	21,200	NA
Manganese	--	73	108	NA	1,350	NA	338	NA	44.3	NA
Mercury	2	1.1	0.1 U	NA	0.22 B	NA	0.1 U	NA	0.1 U	NA
Nickel	--	73	13.8 B	NA	33 J	NA	15.9 J	NA	2.8 B	NA
Potassium	--	--	866 J	NA	1,690 J	NA	1,840 J	NA	2,980 J	NA
Silver	--	18	0.6 U	NA	0.6 U	NA	0.6 U	NA	0.6 U	NA
Sodium	--	--	7,000	NA	5,240	NA	5,680	NA	6,070	NA
Thallium	2	0.26	3.5 B	NA	2.3 UL	NA	4.7 B	NA	2.3 UL	NA
Tin	--	2,200	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	26	4.6 B	NA	11.6 J	NA	3.9 B	NA	1 U	NA
Zinc	--	1,100	43.5	NA	85.7	NA	63.2	NA	31.4	NA

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

1
Site 5 Alluvial N. J Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW21		5GW22		5GW23		5GW24	
Sample ID			AS05-5GW21-R05	AS05-5GW21-R06	AS05-5GW22-R05	AS05-5GW22-R06	AS05-5GW23-R05	AS05-5GW23-R06	AS05-5GW24-R05	AS05-5GW24-R06
Sample Date			08/08/00	04/04/01	08/08/00	04/19/01	08/08/00	04/04/01	08/07/00	04/09/01
Chemical Name										
Dissolved Metals (UG/L)										
Aluminum	--	3,700	19.2 U	49.7 B	19.2 U	52.6 J	19.2 U	30.8 B	19.2 U	26.6 B
Antimony	6	1.5	4.9 U	3.1 U	4.9 U	3.1 U	4.9 U	3.7 J	4.9 U	3.1 U
Arsenic	50	0.05	7.7 B	2.5 U	3.8 U	2.5 U	5.6 B	3.5 K	3.8 U	3.2 B
Barium	2,000	260	89.4 J	106 J	82.9 J	110 J	353	380	72.7 J	72.9 B
Beryllium	4	7.3	0.1 U	0.28 B	0.1 U	0.75 B	0.1 U	0.26 B	0.1 U	0.1 U
Boron	--	330	NA	50 U	NA	50 U	NA	50 U	NA	51.4
Cadmium	5	1.8	0.4 U	0.56 B	0.4 U	0.4 U	0.4 U	0.56 B	0.4 U	0.4 U
Calcium	--	--	61,800	67,200	49,400	64,000	65,200	64,400	132,000	121,000
Chromium	100	11	0.8 B	1 J	0.96 B	0.8 U	0.7 U	0.8 U	0.7 U	0.8 U
Cobalt	--	220	1.1 U	1.6 J	3.4 B	1 U	1.6 B	1.3 J	1.1 U	1 U
Copper	1,300	150	0.7 UL	3.2 J	0.7 UL	0.8 U	0.7 UL	1.5 B	0.7 UL	1.4 B
Iron	--	2,200	15.9 U	79.5 J	15.9 U	14.7 U	1,720	3,640	15.9 U	14.7 U
Lead	15	15	2 U	2.5 U	2 U	2.5 U	2 U	2.5 U	3.5	2.5 U
Magnesium	--	--	7,430	8,340	6,920	8,670	7,390	7,740	22,500	19,800
Manganese	--	73	24.7	18.2	284	65.1	331	294	16.2	2.6 B
Mercury	2	1.1	0.1 U	0.2 UL	0.1 U	0.2 U	0.1 U	0.22 L	0.11 B	1.2 L
Molybdenum	--	18	NA	10 U	NA	10 R	NA	10 U	NA	10 U
Nickel	--	73	4 B	3.6 J	8.3 B	2.2 B	4.5 B	2.3 J	2 U	1.8 B
Potassium	--	--	256 B	277 J	754 B	372 J	1,320 J	1,220 J	4,330 J	4,160 J
Selenium	50	18	2.4 B	3.2 U	2.2 UL	3.2 U	2.2 UL	3.2 U	2.3 B	3.2 U
Silver	--	18	0.6 U	1.3 U	0.6 U	1.3 U	0.6 U	1.3 U	0.6 U	1.3 U
Sodium	--	--	7,870	9,150	6,270	7,450	5,630	6,740	6,600	11,400
Thallium	2	0.26	2.3 UL	4.1 K	2.3 UL	3.9 U	2.3 UL	5.3 K	2.3 UL	5.5 B
Vanadium	--	26	1 U	34.9 U	1 U	34.9 U	1 U	34.9 U	1 U	34.9 U
Zinc	--	1,100	21	44.9	29.7	46.6 R	18.4 J	37.1 B	8.9 J	27 B
Wet Chemistry (MG/L)										
Alkalinity	--	--	100	110	83	77	180	190	350	287
Ammonia	--	0.021	0.2 U	0.2 U	0.2 U	0.2 U	0.39	0.2 U	0.2 U	0.2 U
BOD-5day (total)	--	--	NA	2 U	NA	2.1	NA	2 U	NA	4.5
Bicarbonate	--	--	100	110	83	77	180	190	340	290
Biological oxygen demand	--	--	2 U	NA	2 U	NA	2 U	NA	2 U	NA
Chemical oxygen demand	--	--	5 U	33	5 U	18	5 U	41	5 U	31
Chloride	--	--	28	28	20	18	10	13	10	28
Hardness	--	--	170	200	140	200	170	200	400	380
Methane	--	--	1.00E-03 U	NA	0.0012	NA	1.00E-03 U	NA	0.0011	NA
Nitrate	10	5.8	0.5 U	NA	1.3	NA	0.5 U	NA	1.8	NA
Nitrate/Nitrite	10	--	NA	0.55 U	NA	0.55 U	NA	0.55 U	NA	1.5
Nitrite	1	0.37	0.09	NA	0.17	NA	0.05 U	NA	0.05 U	NA
pH	--	--	5.54	NA	5.62	NA	5.98	NA	6.49	NA
Oil and Grease	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	62	75	71	99	33	50	77	88
Total dissolved solids (TDS)	--	--	210	260 L	170	260	200	280 L	NA	450
Total organic carbon (TOC)	--	--	1 U	1.3	1 U	1 U	1.3	1.5	1.2	1.1
Total recoverable phenolics	--	--	0.03 U	0.025 U	0.03 U	0.025 U	0.03 U	0.025	0.03 U	0.025 U
Reactivity (MG/L)										
No Detections										

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
D - Result came from a diluted sample
E - Estimated - Interference

J - Reported value is estimated
K - Biased high
L - Biased low

2
Site 5 Bedrock Monitoring Wells Detected Constituents
Allegany Health Services Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW02						
Sample ID			AS05-5GW02-R01	AS05-5GW02-R02	AS05-5GW02-R03	AS05-5GW02P-R04	AS05-5GW02-R04	AS05-5GW02-R05	AS05-5GW02-R06
Sample Date			05/06/98	10/13/98	01/20/99	10/22/99	10/22/99	08/03/00	04/11/01
Chemical Name									
Volatile Organic Compounds (UG/L)									
Acetone	--	61	10 UJ	5 U	5 U	5 U	5 U	5 R	23 L
Carbon disulfide	--	100	10 U	1 U	1 U	1 U	1 U	1 UJ	1 U
Carbon tetrachloride	5	0.16	10 U	1 U	1 U	1 U	1 U	1 U	0.7 J
Ethane	--	--	NA	NA	NA	NA	NA	NA	4 U
Methane	--	--	NA	NA	NA	NA	NA	NA	2 U
Methylene chloride	5	4.1	10 U	2 U	2 U	1.4 J	1.1 J	1.1 B	0.5 B
Toluene	1,000	75	10 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1.6	8	5	6.4	8.2	8	8.2	7.2
cis-1,2-Dichloroethene	70	6.1	NA	1 U	1 U	1 J	0.8 J	1 J	0.8 J
Semi-volatile Organic Compounds (UG/L)									
No Detections									
Pesticide/Polychlorinated Biphenyls (UG/L)									
No Detections									
Herbicides (UG/L)									
No Detections									
Explosives (UG/L)									
No Detections									
Total Metals (UG/L)									
Aluminum	--	3,700	36.7 U	43.3 U	115 B	29.5 B	15.4 B	19.2 U	NA
Antimony	6	1.5	2.3 U	1.9 U	3 U	5 U	5 U	4.9 U	NA
Arsenic	50	0.045	2.3 UL	3.6 U	4 U	6 U	6 U	3.8 U	NA
Barium	2,000	260	30.4 B	25 B	25.5 B	22.9 B	24.7 B	19.3 J	NA
Beryllium	4	7.3	0.61 U	0.91 U	1 U	1 U	1 U	0.1 U	NA
Boron	--	330	NA	NA	NA	179	203	207	NA
Calcium	--	--	69,400	68,700	65,400	66,000	72,100	71,900	NA
Chromium	100	11	6.6 U	6.1 U	1 U	1 U	1 U	0.7 UL	NA
Cobalt	--	220	7.5 B	9.4 B	6.8 B	10.6 B	10.6 B	8.6 J	NA
Copper	1,300	150	5.5 U	5 U	19.4 B	14.8 B	13.5 B	4.8 B	NA
Cyanide	200	73	NA	NA	4 U	5 U	5 U	10 U	10 U
Iron	--	2,200	113 B	952	4,360	2,320	2,510	1,780	NA
Lead	15	15	8.2 B	2.2 U	1 U	2 U	2 U	2 U	NA
Magnesium	--	--	22,800	23,800	22,300	22,400	24,500	24,700	NA
Manganese	--	73	5,400	2,170	1,010	1,540	1,690	1,540	NA
Molybdenum	--	18	NA	NA	NA	50 U	50 U	10 U	NA
Nickel	--	73	7.4 J	41.1	26.8 B	38.8 B	42.3	27.2 J	NA
Potassium	--	--	3,070 J	3,130 B	3,020 B	2,770 B	3,090 B	3,700 J	NA
Selenium	50	18	4.3 K	2.9 U	4 U	5 U	5 U	2.2 U	NA
Silver	--	18	2.8 UL	1 U	2 U	1 U	1 U	0.6 UL	NA
Sodium	--	--	40,700 J	38,000	37,300	32,200	35,300	34,500	NA
Thallium	2	0.26	1.7 U	2.8 U	3 U	7 U	7 U	2.3 U	NA
Zinc	--	1,100	22.9 B	22.1	37.3	37.2	32.6	49.7	NA
Dissolved Metals (UG/L)									
Aluminum	--	3,700	88.2 B	43.3 U	34.9 B	85.3 B	36.6 B	71.6 B	67.4 B

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated - interference
J - Reported value is estimated

K - Biased high
L - Biased low
R - Unreliable result
U - Analyte not detected

2
Site 5 Bedrock Monitoring Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW02						
Sample ID			AS05-5GW02-R01	AS05-5GW02-R02	AS05-5GW02-R03	AS05-5GW02P-R04	AS05-5GW02-R04	AS05-5GW02-R05	AS05-5GW02-R06
Sample Date			05/06/98	10/13/98	01/20/99	10/22/99	10/22/99	08/03/00	04/11/01
Chemical Name									
Antimony	6	1.5	2.3 U	1.9 U	3 U	5 U	5 U	4.9 U	3.1 U
Arsenic	50	0.05	2.3 UL	3.6 U	4 U	6 U	6 U	3.8 U	2.5 U
Barium	2,000	260	31.6 B	24.1 B	20.8 B	24.2 B	23.8 B	20.4 J	30.3 J
Beryllium	4	7.3	0.61 U	0.91 U	1 U	1 U	1 U	0.1 U	0.34 B
Boron	--	330	NA	NA	NA	NA	NA	185	50 U
Calcium	--	--	68,000	69,300	51,800	70,900	69,600	76,600	73,600
Chromium	100	11	6.6 U	6.1 U	1 U	1 U	1 U	0.7 U	0.8 U
Cobalt	--	220	9.2 B	7.1 B	3.8 B	11.5 B	12.2 B	9.9 J	6.1 J
Copper	1,300	150	5.5 U	5 U	4.7 B	45	22.8 B	2.3 B	3.6 B
Iron	--	2,200	155 B	712	3,100	2,510	2,540	2,120	55.7 B
Lead*	15	15	18.3 J	2.2 U	3.4	2 U	2 U	2 U	2.5 U
Magnesium	--	--	23,500	23,600	18,800	23,900	23,200	25,900	27,300
Manganese	--	73	5,190	2,150	817	1,840	1,570	1,620	3,930
Mercury	2	1.1	0.13 UL	0.13 U	0.2 U	0.2 U	0.2 U	0.1 U	0.83 L
Molybdenum	--	18	NA	NA	NA	NA	NA	10 U	10 U
Nickel	--	73	12 J	34.2 B	21.1 B	41.7	42.2	34.1 J	18.1 J
Potassium	--	--	3,290 J	3,180 B	2,480 B	3,040 B	2,840 B	3,750 J	4,320 J
Selenium	50	18	3.6 U	2.9 U	4 U	5 U	5 U	2.2 B	3.2 U
Silver	--	18	4.9 L	1.3 B	2 U	1 U	1 U	0.91 B	1.5 J
Sodium	--	--	41,400	36,300	31,400	34,300	33,000	36,300 J	45,000
Thallium	2	0.26	1.7 U	2.8 U	3 U	7 U	7 U	2.3 U	3.9 U
Vanadium	--	26.00	5.8 U	5.3 U	1 U	2 U	2 U	1 U	34.9 U
Zinc	--	1,100	25.1	22.1	28.7	40.8	54.6	33.7 B	45.4 B
Wet Chemistry (MG/L)									
Alkalinity	--	--	163	111	118	98	101	110	120
Ammonia	--	0.021	0.76	0.18	0.1 U	0.1 U	0.1 U	0.2 U	0.25
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	NA	6.8
Bicarbonate	--	--	163	111	2 U	97.9	100	110	120
Biological oxygen demand	--	--	5	2 U	0.66	2.64	2.4	2 U	NA
Chemical oxygen demand	--	--	7.6	5 U	5 U	5 U	5 U	8	42
Chloride	--	--	24.1	57.8	47.9	NA	NA	42	36
Hardness	--	--	NA	NA	255	258	281	280	296
Methane	--	--	NA	NA	NA	NA	NA	0.0596	NA
Nitrate	10	5.8	NA	NA	0.075	0.15	0.1	0.5 U	NA
Nitrate/Nitrite	10	--	0.46	0.1	NA	NA	NA	NA	0.55 U
Nitrite	1	0.37	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA
pH	--	--	NA	5.7	5.96	5.51	5.51	5.36	NA
Oil and Grease	--	--	1 U	1 U	NA	NA	NA	NA	NA
Sulfate	--	--	194	192	204	108	114	190	280
Total dissolved solids (TDS)	--	--	465	464	367	360	370	360	560
Total organic carbon (TOC)	--	--	4.5	5.6	10 U	100 U	100 U	2.3	4.5
Total recoverable phenolics	--	--	NA	NA	50 U	0.165	0.425	0.03 U	0.025 U
Reactivity (MG/L)									
No Detections									

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated - Interference
J - Reported value is estimated

K - Biased high
L - Biased low
R - Unreliable result
U - Analyte not detected

2
Site 5 Bedrock Monitoring Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW03							
			AS05-5GW03-R01	AS05-5GW03-R02	AS05-5GW03P-R02	AS05-5GW03-R03	AS05-5GW03P-R03	AS05-5GW03-R04	AS05-5GW03-R05	AS05-5GW03-R06
			05/06/98	10/13/98	10/13/98	01/20/99	01/20/99	10/22/99	08/07/00	04/11/01
Sample ID										
Sample Date										
Chemical Name										
Volatile Organic Compounds (UG/L)										
Acetone	--	61	2 R	5 U	5 U	5 U	5 U	NA	5 R	5 R
Carbon disulfide	--	100	1 U	1 U	0.6 J	1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	5	0.16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	NA	NA	NA	NA	4 U
Methane	--	--	NA	NA	NA	NA	NA	NA	NA	2 U
Methylene chloride	5	4.1	1 U	2 U	2 U	2 U	2 U	1 U	0.7 B	2 U
Toluene	1,000	75	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1.6	4	9	10	9.4	3.5	14	4.4	6.3
cis-1,2-Dichloroethene	70	6.1	NA	0.9 J	1	1 U	1 U	NA	0.7 J	0.6 J
Semi-volatile Organic Compounds (UG/L)										
No Detections										
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Herbicides (UG/L)										
No Detections										
Explosives (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	--	3,700	NA	304	302	2,930	4,360	79.6 B	19.2 U	NA
Antimony	6	1.5	2.3 U	1.9 U	1.9 U	3 U	3 U	5 U	4.9 U	NA
Arsenic	50	0.045	2.3 UL	3.6 U	3.6 U	4 U	4.2 B	6 U	3.8 U	NA
Barium	2,000	260	30.7 B	30.1 B	36.2 B	80.5 B	118 B	27.8 B	34.8 J	NA
Beryllium	4	7.3	1 J	0.91 U	0.91 U	1 U	1 U	1 U	0.1 U	NA
Boron	--	330	NA	NA	NA	NA	NA	121	NA	NA
Calcium	--	--	NA	65,700	74,000	84,400	74,600	61,600	88,800	NA
Chromium	100	11	9.6 B	6.1 U	6.1 U	6 B	8.6 B	1 U	0.7 U	NA
Cobalt	--	220	8.1 B	5 U	5 U	2.1 B	4.4 B	1 U	1.1 U	NA
Copper	1,300	150	5.5 U	5 U	60.9	13.9 B	23.5 B	32.1	2.7 B	NA
Cyanide	200	73	NA	NA	NA	4 U	4 U	5 U	10 U	10 U
Iron	--	2,200	NA	715	667	6,440	11,200	41.2 B	168 B	NA
Lead	15	15	11.7 B	2.3 B	2.2 U	2.9 B	5.3	2 U	2 UL	NA
Magnesium	--	--	NA	20,800	23,100	22,700	20,800	21,200	16,100	NA
Manganese	--	73	NA	653	736	1,210	1,430	549	69.3	NA
Molybdenum	--	18	NA	NA	NA	NA	NA	50 U	NA	NA
Nickel	--	73	6.8 U	95.5	108	59.8	63.2	40.7	6 B	NA
Potassium	--	--	NA	3,190 B	3,430 B	3,240 B	3,140 B	2,900 B	2,640 J	NA
Selenium	50	18	3.6 U	2.9 U	2.9 U	4 U	4 U	5 U	2.2 UL	NA
Silver	--	18	2.8 UL	2 B	4.5 B	2 U	2 U	1 U	0.6 U	NA
Sodium	--	--	NA	24,700	27,600	17,500	16,900	25,500	4,440 J	NA
Thallium	2	0.26	1.7 U	2.8 U	7.1 B	3 U	3 U	7 U	2.3 UL	NA
Zinc	--	1,100	22.9 B	38.3	39.9	53	64.6	48	34.1	NA
Dissolved Metals (UG/L)										
Aluminum	--	3,700	NA	43.3 U	43.3 U	33.8 B	42.7 B	38.4 B	19.2 U	61.5 B

NA - Not analyzed
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E - Estimated - Interference
J - Reported value is estimated

K - Biased high
L - Biased low
R - Unreliable result
U - Analyte not detected

2
 Site 5 Bedrock M. g Wells Detected Constituents
 Allegany Ballistics Laboratory
 Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW03							
Sample ID			AS05-5GW03-R01	AS05-5GW03-R02	AS05-5GW03P-R02	AS05-5GW03-R03	AS05-5GW03P-R03	AS05-5GW03-R04	AS05-5GW03-R05	AS05-5GW03-R06
Sample Date			05/06/98	10/13/98	10/13/98	01/20/99	01/20/99	10/22/99	08/07/00	04/11/01
Chemical Name										
Antimony	6	1.5	NA	1.9 U	1.9 U	3 U	3 U	5 U	4.9 U	3.1 U
Arsenic	50	0.05	NA	3.6 U	6 B	4 U	4 U	6 U	6.2 B	3.1 B
Barium	2,000	260	NA	30.1 B	28.7 B	21.9 B	25.1 B	27.6 B	36.1 J	29.6 J
Beryllium	4	7.3	NA	0.91 U	0.91 U	1 U	1 U	1 U	0.1 U	0.5 B
Boron	--	330	NA	NA	NA	NA	NA	NA	NA	124
Calcium	--	--	NA	78,200	75,400	80,900	79,200	61,700	99,100	99,900
Chromium	100	11	NA	6.1 U	6.1 U	1 U	1 U	1 U	0.7 U	1.3 J
Cobalt	--	220	NA	5 U	5 U	1 U	1.3 B	1 U	1.1 U	1.7 J
Copper	1,300	150	NA	5 U	6.8 B	18.5 B	11.8 B	7.8 B	0.7 UL	2.8 J
Iron	--	2,200	NA	75.7 B	127	104	57.2 B	16 U	15.9 U	42.1 J
Lead*	15	15	NA	2.2 U	2.2 U	1 U	1 U	2 U	2 U	4.6 B
Magnesium	--	--	NA	23,200	22,200	21,400	21,600	21,300	17,800	21,600
Manganese	--	73	NA	675	813	944	833	537	7.7 J	71.2
Mercury	2	1.1	NA	0.13 U	0.13 U	0.2 U	0.2 U	0.2 U	0.1 U	0.2 UL
Molybdenum	--	18	NA	NA	NA	NA	NA	NA	NA	10 U
Nickel	--	73	NA	91.1	87.6	50.7	51.1	40.2	4.4 B	9.2 J
Potassium	--	--	NA	3,130 B	2,920 B	2,390 B	2,580 B	2,910 B	4,250 J	3,240 J
Selenium	50	18	NA	2.9 U	2.9 U	4 U	4 U	5 U	4.4 B	3.2 U
Silver	--	18	NA	3 B	4.9 B	2 U	3.1 B	1 U	0.6 U	1.3 U
Sodium	--	--	NA	25,800	23,500	17,800	19,100	25,400	5,860	11,700
Thallium	2	0.26	NA	2.8 U	5.2 B	3 U	3 U	7 U	2.3 UL	3.9 B
Vanadium	--	26.00	NA	5.3 U	5.3 U	1 U	2 B	2 U	1 U	34.9 U
Zinc	--	1,100	NA	36.7	38.4	35.4	36.5	40.5	18.6 J	44.6 B
Wet Chemistry (MG/L)										
Alkalinity	--	--	128	116	117	172	162	65	240	180
Ammonia	--	0.021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	NA	NA	7.2
Bicarbonate	--	--	128	116	117	2 U	2 U	64.9	240	180
Biological oxygen demand	--	--	2 U	2 U	2 U	2.1	1.92	1.8	2 U	NA
Chemical oxygen demand	--	--	5 U	7	5 U	5 U	5 U	5 U	5 U	36
Chloride	--	--	7.6	16.3	16.4	17.7	16	17.7	5.2	12
Hardness	--	--	NA	NA	NA	304	270	243	290	338
Methane	--	--	NA	NA	NA	NA	NA	NA	1.00E-03 U	NA
Nitrate	10	5.8	NA	NA	NA	0.05 U	0.05 U	0.4	1.1	NA
Nitrate/Nitrite	10	--	1.29	0.49	0.46	NA	NA	NA	NA	1.5
Nitrite	1	0.37	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA
pH	--	--	NA	5.66	5.66	6.08	6.08	5.33	5.8	NA
Oil and Grease	--	--	1.2	1	1 U	NA	NA	NA	NA	NA
Sulfate	--	--	133	182	170	166	162	128	77	210
Total dissolved solids (TDS)	--	--	320	400	374	354	351	300	NA	460
Total organic carbon (TOC)	--	--	3.3	5	6.2	10 U	10 U	100 U	1.7	1 U
Total recoverable phenolics	--	--	NA	NA	NA	50 U	50 U	0.05 U	0.03 U	0.025 U
Reactivity (MG/L)										
No Detections										

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
 B - Analyte not detected above associated blank
 E - Estimated - Interference
 J - Reported value is estimated

K - Biased high
 L - Biased low
 R - Unreliable result
 U - Analyte not detected

2
Site 5 Bedrock Monitoring Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW06				5GW10			
Sample ID			AS05-5GW06-R01	AS05-5GW06-R02	AS05-5GW06-R05	AS05-5GW06-R06	AS05-5GW10-R01	AS05-5GW10-R02	AS05-5GW10-R03	AS05-5GW10-R04
Sample Date			05/08/98	10/12/98	08/10/00	04/20/01	05/06/98	10/12/98	01/20/99	10/21/99
Chemical Name										
Volatile Organic Compounds (UG/L)										
Acetone	--	61	13 J	6	5 R	5 R	2 R	5 U	5 U	NA
Carbon disulfide	--	100	1 U	0.8 J	1 U	1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	5	0.16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	4 U	NA	NA	NA	NA
Methane	--	--	NA	NA	NA	20 U	NA	NA	NA	NA
Methylene chloride	5	4.1	1 U	1 BJ	2 UJ	2 U	0.7 B	2 U	2 U	1 U
Toluene	1,000	75	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	1 U	1 U	1 U	NA	1 U	1 U	NA
Semi-volatile Organic Compounds (UG/L)										
No Detections										
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Herbicides (UG/L)										
No Detections										
Explosives (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	--	3,700	NA	43.3 U	19.2 U	45.4 B	NA	43.3 U	32.7 B	45.7 B
Antimony	6	1.5	2.3 U	1.9 U	6.3 B	6.7 J	2.3 U	1.9 U	3 U	5 U
Arsenic	50	0.045	6.8 B	3.6 U	3.8 U	3.8 K	2.3 UL	3.6 U	4 U	6 U
Barium	2,000	260	192 J	197 B	156 J	198 J	169 J	185 B	143 B	167 B
Beryllium	4	7.3	0.61 U	0.91 U	0.22 B	0.8 B	0.61 U	0.91 U	1 U	1 U
Boron	--	330	NA	NA	104	148	NA	NA	NA	NA
Calcium	--	--	NA	91,600	98,000	114,000	NA	82,800	76,700	74,300
Chromium	100	11	52.2	7.4 B	12.6	0.8 U	6.6 U	6.1 U	1 U	4.9 B
Cobalt	--	220	14.3 J	5 U	2.8 B	3.3 J	5.7 U	5 U	1 U	1 U
Copper	1,300	150	5.5 U	5 U	6.8 J	1.1 J	5.5 U	5 U	15.6 B	8.1 B
Cyanide	200	73	NA	NA	10 U	11	NA	NA	4 U	5 U
Iron	--	2,200	NA	6,490	5,770 J	83.1 J	NA	1,050	966	959
Lead	15	15	4.1 B	2.4 B	2 U	2.5 U	15.9 B	2.2 U	1 U	2 U
Magnesium	--	--	NA	29,000	26,600	30,700	NA	8,190	7,610	7,160
Manganese	--	73	NA	115	129	86.6	NA	149	99.9	114
Molybdenum	--	18	NA	NA	10 U	11.9 J	NA	NA	NA	NA
Nickel	--	73	56.7 K	18.8 B	21.4 J	13.4 J	6.8 U	8.8 U	1 U	4.2 B
Potassium	--	--	NA	5,820	4,710 J	6,040 J	NA	345 B	401 B	358 B
Selenium	50	18	3.6 U	2.9 U	7.1	3.2 U	3.6 U	2.9 U	4 U	5 U
Silver	--	18	2.8 UL	3.7 B	0.6 U	1.3 U	2.8 UL	5.6 B	2 U	1.1 B
Sodium	--	--	NA	16,700	12,000	16,100 J	NA	5,320	5,600	5,410
Thallium	2	0.26	1.8 B	3.6 B	3.9 B	5 B	1.7 U	2.9 B	3 U	7 U
Zinc	--	1,100	26.4 B	17.2 B	32.7	47 B	27.6 B	487	23.1	5.2 B
Dissolved Metals (UG/L)										
Aluminum	--	3,700	NA	43.3 U	19.2 U	92.8 J	NA	344	32.8 B	40.3 B

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated - interference
J - Reported value is estimated

K - Biased high
L - Biased low
R - Unreliable result
U - Analyte not detected

2
Site 5 Bedrock Monitoring Wells Detected Constituents
Allegany County Health Laboratory
Rocket Center, West Virginia

Station ID Sample ID Sample Date Chemical Name	MCL- Groundwater	Tap Water Adjusted RBC	5GW06				5GW10			
			AS05-5GW06-R01	AS05-5GW06-R02	AS05-5GW06-R05	AS05-5GW06-R06	AS05-5GW10-R01	AS05-5GW10-R02	AS05-5GW10-R03	AS05-5GW10-R04
			05/08/98	10/12/98	08/10/00	04/20/01	05/06/98	10/12/98	01/20/99	10/21/99
Antimony	6	1.5	NA	2.1 B	4.9 U	3.1 U	NA	1.9 U	3 U	5 U
Arsenic	50	0.05	NA	3.6 U	7.1 B	2.7 J	NA	3.6 U	4 U	6 U
Barium	2,000	260	NA	179 B	177 J	202 E	NA	232	149 B	168 B
Beryllium	4	7.3	NA	0.91 U	0.1 U	0.76 J	NA	0.91 U	1 U	1 U
Boron	--	330	NA	NA	104	50 U	NA	NA	NA	50 U
Calcium	--	--	NA	90,700	103,000	118,000	NA	109,000	75,000	73,800
Chromium	100	11	NA	6.1 U	3 B	2.2 J	NA	6.1 U	1 U	1 U
Cobalt	--	220	NA	5 U	1.7 B	2.7 J	NA	5 U	1 U	1 U
Copper	1,300	150	NA	6.3 B	0.7 U	1.3 J	NA	5 U	10.8 B	10.7 B
Iron	--	2,200	NA	4,420	6,430	2,960	NA	1,520	937	904
Lead*	15	15	NA	2.2 U	2 U	2.5 U	NA	2.2 U	1 U	2 U
Magnesium	--	--	NA	28,000	30,500	31,600	NA	10,800	7,390	7,130
Manganese	--	73	NA	132	138	72.2	NA	177	97.2	114
Mercury	2	1.1	NA	0.13 U	0.4 B	0.2 U	NA	0.13 U	0.2 U	0.2 U
Molybdenum	--	18	NA	NA	10 U	10 R	NA	NA	NA	50 U
Nickel	--	73	NA	23.3 B	10.5 K	5.2 J	NA	8.8 U	1 U	2 U
Potassium	--	--	NA	5,880	5,330	6,100	NA	503 B	314 B	340 B
Selenium	50	18	NA	2.9 U	2.2 U	3.2 U	NA	2.9 U	4 U	5 U
Silver	--	18	NA	3.5 B	0.6 U	1.3 U	NA	4.2 B	2 U	1.3 B
Sodium	--	--	NA	16,500	14,200	16,700	NA	7,010	5,560	5,200 E
Thallium	2	0.26	NA	4.7 B	2.3 UL	3.9 U	NA	2.8 U	3 U	7 U
Vanadium	--	26.00	NA	5.3 U	1 U	34.9 U	NA	5.3 U	1 U	2 U
Zinc	--	1,100	NA	10.6 B	13.9 B	39.6	NA	11.9 B	22.1	4.5 B
Wet Chemistry (MG/L)										
Alkalinity	--	--	2,920	311	400	360	208	209	230	171
Ammonia	--	0.021	0.1 U	0.1 U	0.2 U	0.2 U	0.14	0.1 U	0.1 U	0.1 U
BOD-5day (total)	--	--	NA	NA	NA	2.4	NA	NA	NA	NA
Bicarbonate	--	--	1,250	311	400	360	208	209	2 U	170
Biological oxygen demand	--	--	2 U	2 U	10	NA	2 U	2 U	0.9	1.92
Chemical oxygen demand	--	--	17.2	5 U	5	14	5 U	9.8	5 U	5 U
Chloride	--	--	11.9	4.2	3.2	2.9	6.4	3.4	5 U	5 U
Hardness	--	--	NA	NA	350	430	NA	NA	224	209
Methane	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	5.8	NA	NA	0.5 U	NA	NA	NA	0.05 U	0.2
Nitrate/Nitrite	10	--	0.05 U	0.05 U	NA	0.55 U	0.05 U	0.05 U	NA	NA
Nitrite	1	0.37	NA	NA	0.05 U	NA	NA	NA	0.05 U	0.05 U
pH	--	--	NA	NA	6.66	NA	NA	6.78	7.2	7.02
Oil and Grease	--	--	1.9	1	NA	NA	1 U	1 U	NA	NA
Sulfate	--	--	5 U	79.3	50	36	21.4	18.5	17	9.84
Total dissolved solids (TDS)	--	--	3,010	429	370	450	258	268	217	220
Total organic carbon (TOC)	--	--	7.6	6.8	1.5	2.4	2.3	2.5	10 U	100 U
Total recoverable phenolics	--	--	NA	NA	0.03 U	0.025 U	NA	NA	50 U	50 U
Reactivity (MG/L)										
No Detections										

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated - Interference
J - Reported value is estimated

K - Biased high
L - Biased low
R - Unreliable result
U - Analyte not detected

Site 5 Bedrock M... Wells Detected Constituents
 Allegany Ballistics Laboratory
 Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	AS05-5GW10-R05 08/02/00	AS05-5GW10P-R06 04/11/01	AS05-5GW10-R06 04/11/01
Sample ID					
Sample Date					
Chemical Name					
Volatile Organic Compounds (UG/L)					
Acetone	--	61	5 R	5 R	5 R
Carbon disulfide	--	100	1 U	1 U	1 U
Carbon tetrachloride	5	0.16	1 U	1 U	1 U
Ethane	--	--	NA	2	4
Methane	--	--	NA	9	8
Methylene chloride	5	4.1	2 U	0.6 B	0.5 B
Toluene	1,000	75	1 U	1 U	1 U
Trichloroethene	5	1.6	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)					
No Detections					
Pesticide/Polychlorinated Biphenyls (UG/L)					
No Detections					
Herbicides (UG/L)					
No Detections					
Explosives (UG/L)					
No Detections					
Total Metals (UG/L)					
Aluminum	--	3,700	60.3 B	NA	NA
Antimony	6	1.5	4.9 U	NA	NA
Arsenic	50	0.045	3.8 UL	NA	NA
Barium	2,000	260	165 J	NA	NA
Beryllium	4	7.3	0.1 U	NA	NA
Boron	--	330	50 R	NA	NA
Calcium	--	--	77,000	NA	NA
Chromium	100	11	0.7 U	NA	NA
Cobalt	--	220	1.1 U	NA	NA
Copper	1,300	150	3.5 B	NA	NA
Cyanide	200	73	10 U	110	10 U
Iron	--	2,200	890	NA	NA
Lead	15	15	2 U	NA	NA
Magnesium	--	--	7,500	NA	NA
Manganese	--	73	122	NA	NA
Molybdenum	--	18	10 U	NA	NA
Nickel	--	73	2 U	NA	NA
Potassium	--	--	371 B	NA	NA
Selenium	50	18	2.2 UL	NA	NA
Silver	--	18	0.6 UL	NA	NA
Sodium	--	--	3,880 B	NA	NA
Thallium	2	0.26	2.3 U	NA	NA
Zinc	--	1,100	30.3 B	NA	NA
Dissolved Metals (UG/L)					
Aluminum	--	3,700	NA	78.2 B	50 B

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2
Site 5 Bedrock Wells Detected Constituents
Allegany Health Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	AS05-5GW10-R05	AS05-5GW10P-R06	AS05-5GW10-R06
Sample ID			08/02/00	04/11/01	04/11/01
Sample Date					
Chemical Name					
Antimony	6	1.5	NA	3.1 U	3.1 U
Arsenic	50	0.05	NA	3.1 B	3 B
Barium	2,000	260	NA	203	202
Beryllium	4	7.3	NA	0.3 B	0.45 B
Boron	--	330	NA	50 U	74.4
Calcium	--	--	NA	81,600	82,200
Chromium	100	11	NA	0.8 U	0.8 U
Cobalt	--	220	NA	1 U	1 U
Copper	1,300	150	NA	1.4 B	0.98 B
Iron	--	2,200	NA	1,100	1,000
Lead*	15	15	NA	80.9	2.5 U
Magnesium	--	--	NA	8,080	8,060
Manganese	--	73	NA	135	134
Mercury	2	1.1	NA	0.2 UL	0.2 UL
Molybdenum	--	18	NA	10 U	10 U
Nickel	--	73	NA	1.7 U	1.7 U
Potassium	--	--	NA	487 K	428 J
Selenium	50	18	NA	3.2 U	3.2 U
Silver	--	18	NA	1.3 U	1.3 U
Sodium	--	--	NA	5,620	5,750
Thallium	2	0.26	NA	3.9 U	4.4 B
Vanadium	--	26.00	NA	34.9 U	34.9 U
Zinc	--	1,100	NA	49 B	63.5 B
Wet Chemistry (MG/L)					
Alkalinity	--	--	220	210	210
Ammonia	--	0.021	0.2 U	NA	NA
BOD-5day (total)	--	--	NA	5.6	9.4
Bicarbonate	--	--	220	210	208
Biological oxygen demand	--	--	NA	NA	NA
Chemical oxygen demand	--	--	5 U	23	31
Chloride	--	--	4.6	7.2	7.3
Hardness	--	--	220	237	238
Methane	--	--	NA	NA	NA
Nitrate	10	5.8	0.5 U	NA	NA
Nitrate/Nitrite	10	--	NA	0.55 U	0.55 U
Nitrite	1	0.37	NA	NA	NA
pH	--	--	6.45	NA	NA
Oil and Grease	--	--	NA	NA	NA
Sulfate	--	--	16	19	19
Total dissolved solids (TDS)	--	--	220	420	280
Total organic carbon (TOC)	--	--	1 U	1 U	1 U
Total recoverable phenolics	--	--	0.025 U	0.025 U	0.025 U
Reactivity (MG/L)					
No Detections					

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
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E - Estimated - Interference
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K - Biased high
L - Biased low
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U - Analyte not detected

2
Site 5 Bedrock M, Wells Detected Constituents
Allegany Biomonitoring Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW14						
Sample ID			AS05-5GW14-R01	AS05-5GW14P-R01	AS05-5GW14-R02	AS05-5GW14-R03	AS05-5GW14-R04	AS05-5GW14-R05	AS05-5GW14-R06
Sample Date			05/06/98	05/06/98	10/14/98	01/21/99	10/25/99	08/03/00	04/13/01
Chemical Name									
Volatile Organic Compounds (UG/L)									
Acetone	--	61	10 UJ	10 UJ	5 U	5 U	5 U	5 R	5 R
Carbon disulfide	--	100	10 U	10 U	0.9 J	1 U	1 U	1 UJ	1 U
Carbon tetrachloride	5	0.16	10 U	10 U	1 U	1 U	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	NA	NA	NA	4 U
Methane	--	--	NA	NA	NA	NA	NA	NA	340
Methylene chloride	5	4.1	10 U	10 U	0.6 BJ	2 U	2 U	1.4 B	0.6 B
Toluene	1,000	75	10 U	10 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1.6	10 U	10 U	1 U	7.7	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	NA	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)									
No Detections									
Pesticide/Polychlorinated Biphenyls (UG/L)									
No Detections									
Herbicides (UG/L)									
No Detections									
Explosives (UG/L)									
No Detections									
Total Metals (UG/L)									
Aluminum	--	3,700	532	592	43.3 U	52 B	66.7 B	137 B	NA
Antimony	6	1.5	2.3 U	2.3 U	1.9 U	3 U	5 U	4.9 U	NA
Arsenic	50	0.045	4.6 UL	4.6 UL	3.6 U	4 U	6 U	3.8 U	NA
Barium	2,000	260	150 J	133 J	38.7 B	37 B	48.5 B	30.8 J	NA
Beryllium	4	7.3	0.61 U	0.8 J	0.91 U	1 U	1 U	0.1 U	NA
Boron	--	330	NA	NA	NA	NA	50 U	171	NA
Calcium	--	--	82,600	70,700	68,000	76,300	67,600	65,400	NA
Chromium	100	11	6.6 U	10.5 B	6.1 U	1 U	1 U	0.7 UL	NA
Cobalt	--	220	11.9 B	13.8 B	13.1 B	4.5 B	6.3 B	6.6 J	NA
Copper	1,300	150	5.5 U	5.5 U	5 U	11.3 B	21.7 BE	0.7 U	NA
Cyanide	200	73	NA	NA	NA	4 U	5 U	10 U	10 U
Iron	--	2,200	106,000 J	91,000 J	15,200	23,500	47,800	71,300	NA
Lead	15	15	9.9 B	11.7 B	2.2 U	1 U	92.7	2 U	NA
Magnesium	--	--	22,900	19,900	22,500	22,700	20,900	24,300	NA
Manganese	--	73	1,990	1,710	663	664	1,080	1,390	NA
Molybdenum	--	18	NA	NA	NA	NA	50 U	10 U	NA
Nickel	--	73	55.2	53.6	36.2 B	28.5 B	35.8 B	43.1	NA
Potassium	--	--	2,050 J	2,110 J	1,520 B	1,530 B	1,600 B	1,950 J	NA
Selenium	50	18	3.6 U	3.6 U	2.9 U	4 U	5 U	2.2 U	NA
Silver	--	18	13.4 L	10.9 L	4.4 B	2 U	1 U	0.66 B	NA
Sodium	--	--	13,600 J	11,900 J	11,300	12,400	12,300 E	10,100	NA
Thallium	2	0.26	2.9 J	8.4 J	5.2 B	3 U	7 U	18.7 B	NA
Zinc	--	1,100	120 B	96.1 B	33.3	36.7	71.9	49.4	NA
Dissolved Metals (UG/L)									
Aluminum	--	3,700	202 B	309 B	43.3 U	20.3 B	72.6 B	90.3 B	25.6 B

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2
Site 5 Bedrock Monitoring Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW14							
Sample ID			AS05-5GW14-R01	AS05-5GW14P-R01	AS05-5GW14-R02	AS05-5GW14-R03	AS05-5GW14-R04	AS05-5GW14-R05	AS05-5GW14-R06	
Sample Date			05/06/98	05/06/98	10/14/98	01/21/99	10/25/99	08/03/00	04/13/01	
Chemical Name										
Antimony	6	1.5	2.3 U	2.3 U	1.9 U	3 U	5 U	4.9 U	6.5 B	
Arsenic	50	0.05	2.3 UL	2.3 UL	3.6 U	4 U	6 U	3.8 UL	4 B	
Barium	2,000	260	52.5 J	49.2 J	20.5 B	32 B	41.6 B	32.2 J	35.6 J	
Beryllium	4	7.3	0.61 U	0.61 U	0.91 U	1 U	1 U	0.1 U	0.65 B	
Boron	--	330	NA	NA	NA	NA	NA	50 U	50 U	
Calcium	--	--	74,800	71,900	66,500	81,300	71,600	78,700	96,200	
Chromium	100	11	6.6 U	6.6 U	6.1 U	1 U	1 U	0.7 U	0.8 U	
Cobalt	--	220	6.3 B	9.2 B	7.5 B	4.3 B	6.2 B	6.9 J	9.9 B	
Copper	1,300	150	5.5 U	5.5 U	7 B	7.8 B	53.1 E	0.7 UL	3.4 B	
Iron	--	2,200	82,200 J	78,600 J	14,300	22,200	49,100	79,800	111,000	
Lead*	15	15	6.2 B	5.7 B	2.2 U	1 U	46.2	2.4 B	2.5 U	
Magnesium	--	--	22,200	21,300	22,000	24,500	22,200	26,400	33,400	
Manganese	--	73	1,680	1,610	640	684	1,130	1,620	2,360	
Mercury	2	1.1	0.13 UL	0.13 UL	0.13 U	0.2 U	0.2 U	0.1 U	0.2 U	
Molybdenum	--	18	NA	NA	NA	NA	NA	10 U	10 U	
Nickel	--	73	13.1 J	16.5 J	25.5 B	21.8 B	29.9 B	15.4 J	24.8 K	
Potassium	--	--	2,060 J	2,070 J	1,490 B	1,710 B	1,690 B	2,320 J	2,470 J	
Selenium	50	18	3.6 U	3.6 U	2.9 U	4 U	5 U	14.9 B	3.9 J	
Silver	--	18	9.7 L	11.1 L	4.1 B	2 U	1 U	2.9 B	1.6 B	
Sodium	--	--	12,900	12,400	10,900	13,600	13,100 E	12,900 J	15,900	
Thallium	2	0.26	3.4 J	4.9 J	7.2 B	3 U	7 U	2.3 U	3.9 U	
Vanadium	--	26.00	5.8 U	11.3 B	5.3 U	1 U	2 U	1.2 B	34.9 U	
Zinc	--	1,100	23.4	16.7 B	35.4	29.5	62.4	25.7 B	38.9 B	
Wet Chemistry (MG/L)										
Alkalinity	--	--	170	174	138	162	199	180	200	
Ammonia	--	0.021	0.12	0.1 U	0.2	0.1 U	0.4	0.21	0.54	
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	NA	16	
Bicarbonate	--	--	170	174	138	2 U	198	180	200	
Biological oxygen demand	--	--	2 U	3.9	2 U	0.2 U	7.56	2 U	NA	
Chemical oxygen demand	--	--	13.8	12.4	6.3	5 U	7	15	25	
Chloride	--	--	27.6	27.8	30	26.6	23	31	22	
Hardness	--	--	NA	NA	NA	285	255	260	378	
Methane	--	--	NA	NA	NA	NA	NA	0.336 U	NA	
Nitrate	10	5.8	NA	NA	NA	0.05 U	0.4	0.71	NA	
Nitrate/Nitrite	10	--	0.05 U	0.05 U	0.05 U	NA	NA	NA	0.55 U	
Nitrite	1	0.37	NA	NA	NA	0.05 U	0.07	0.05 U	NA	
pH	--	--	NA	NA	6.01	6.45	6.21	5.97	NA	
Oil and Grease	--	--	1 U	1.8	1 U	NA	NA	NA	NA	
Sulfate	--	--	114	226	147	134	61.0	140	160	
Total dissolved solids (TDS)	--	--	406	391	395	354	350	360	520	
Total organic carbon (TOC)	--	--	2.2	2.3	4.4	10 U	100 U	1	1 U	
Total recoverable phenolics	--	--	NA	NA	NA	50 U	50 U	0.03 U	0.025 U	
Reactivity (MG/L)										
No Detections										

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated - interference
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U - Analyte not detected

2
Site 5 Bedrock Monitoring Wells Detected Constituents
Allegany Biomix Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW16					
Sample ID			AS05-5GW16-R01	AS05-5GW16-R02	AS05-5GW16-R03	AS05-5GW16-R04	AS05-5GW16-R05	AS05-5GW16-R06
Sample Date			03/07/98	10/14/98	01/21/99	10/22/99	08/03/00	04/13/01
Chemical Name								
Volatile Organic Compounds (UG/L)								
Acetone	--	61	10 UJ	5 U	7	5 U	5 R	5 R
Carbon disulfide	--	100	10 U	0.7 J	1 U	1 U	1 UJ	1 U
Carbon tetrachloride	5	0.16	10 U	1 U	1 U	1 U	1 U	1 U
Ethane	--	--	NA	NA	NA	NA	NA	93
Methane	--	--	NA	NA	NA	NA	NA	334
Methylene chloride	5	4.1	10 U	0.6 BJ	2 U	1.4 J	1.3 B	0.5 B
Toluene	1,000	75	10 U	1 U	0.6 J	1 U	1 U	1 U
Trichloroethene	5	1.6	10 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	6.1	NA	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)								
No Detections								
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections								
Herbicides (UG/L)								
No Detections								
Explosives (UG/L)								
No Detections								
Total Metals (UG/L)								
Aluminum	--	3,700	560 B	575	77.2 B	32.6 B	100 B	NA
Antimony	6	1.5	6.2 J	1.9 U	3 U	5 U	4.9 U	NA
Arsenic	50	0.045	2.3 U	3.6 U	4 U	6 U	3.8 U	NA
Barium	2,000	260	68.7 J	142 B	27 B	27.7 B	23 J	NA
Beryllium	4	7.3	0.61 U	0.91 B	1 U	1 U	0.1 U	NA
Boron	--	330	NA	NA	NA	50 U	50 U	NA
Calcium	--	--	112,000	137,000	98,000	29,100	20,600	NA
Chromium	100	11	6.6 UL	6.1 U	1.4 B	1 U	0.7 UL	NA
Cobalt	--	220	5.7 U	5 U	1 U	1 U	1.1 U	NA
Copper	1,300	150	5.5 U	5.3 B	11.5 B	20.6 B	0.7 U	NA
Cyanide	200	73	NA	NA	4 U	5 U	10 U	10 U
Iron	--	2,200	35,400	8,850	27,400	4,300	2,490	NA
Lead	15	15	3.4 B	2.2 U	1 U	2 U	2 U	NA
Magnesium	--	--	21,500	27,200	23,300	16,700	13,900	NA
Manganese	--	73	862	948	480	314	282	NA
Molybdenum	--	18	NA	NA	NA	50 U	10 U	NA
Nickel	--	73	6.8 U	8.8 U	4 B	4 B	2 U	NA
Potassium	--	--	838 B	653 B	553 B	491 B	490 B	NA
Selenium	50	18	3.6 U	2.9 U	4 U	5 U	2.2 U	NA
Silver	--	18	3.6 L	4 B	2 U	1 U	0.6 UL	NA
Sodium	--	--	9,070	10,300	10,500	9,110	7,370	NA
Thallium	2	0.26	6.8 B	6.1 B	3 U	7 U	2.3 U	NA
Zinc	--	1,100	20.4 B	18.4 B	20.9	28.6	16.5 B	NA
Dissolved Metals (UG/L)								
Aluminum	--	3,700	98.7 B	43.3 U	55.2 B	49.7 B	89 B	129 B

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R - Unreliable result
U - Analyte not detected

2
Site 5 Bedrock Mt. Wells Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	MCL- Groundwater	Tap Water Adjusted RBC	5GW16					
Sample ID			AS05-5GW16-R01	AS05-5GW16-R02	AS05-5GW16-R03	AS05-5GW16-R04	AS05-5GW16-R05	AS05-5GW16-R06
Sample Date			03/07/98	10/14/98	01/21/99	10/22/99	08/03/00	04/13/01
Chemical Name								
Antimony	6	1.5	2.3 J	1.9 U	3 U	5.6 B	4.9 U	6.6 B
Arsenic	50	0.05	2.3 U	3.6 U	4 U	6 U	3.8 UL	3.8 B
Barium	2,000	260	25.3 B	15.5 B	33 B	25.1 B	25 J	34.3 J
Beryllium	4	7.3	0.61 U	0.91 U	1 U	1 U	0.1 U	0.61 B
Boron	--	330	NA	NA	NA	NA	50 U	153
Calcium	--	--	103,000	128,000	117,000	26,700	22,600	172,000
Chromium	100	11	6.6 UL	6.1 U	1 U	1 U	0.7 U	0.86 J
Cobalt	--	220	8 J	5 U	1 U	1 U	1.1 U	2.6 J
Copper	1,300	150	7.9 B	8.3 B	8.3 B	13 B	0.7 UL	1.7 J
Iron	--	2,200	18,000	4,090	29,800	1,390	748	29,700
Lead*	15	15	1.7 U	2.2 U	1 U	2 U	2 U	2.5 U
Magnesium	--	--	19,800	25,400	28,500	15,700	15,100	33,800
Manganese	--	73	736	847	528	280	288	1,130
Mercury	2	1.1	0.13 U	0.15 U	0.2 U	0.2 U	0.1 U	0.2 U
Molybdenum	--	18	NA	NA	NA	NA	12.7 J	10 U
Nickel	--	73	6.8 U	8.8 U	2.9 B	2 U	2 U	1.7 U
Potassium	--	--	559 J	478 B	627 B	418 B	556 B	888 J
Selenium	50	18	3.6 U	2.9 U	4 U	5 U	3.3 B	3.2 U
Silver	--	18	2.8 UL	2.9 B	2 U	1 U	1 B	1.3 U
Sodium	--	--	8,530	9,640	11,900	9,230	9,100 J	12,600
Thallium	2	0.26	1.8 B	2.8 U	3 U	7 U	2.3 U	3.9 U
Vanadium	--	26.00	8 J	5.3 U	1 U	2 U	1 U	34.9 U
Zinc	--	1,100	19.2 B	9.3 B	22.6	32.4	9.7 B	20 B
Wet Chemistry (MG/L)								
Alkalinity	--	--	200	221	214	55	55	310
Ammonia	--	0.021	0.32	0.22	0.1 U	0.1 U	0.38	0.35
BOD-5day (total)	--	--	NA	NA	NA	NA	NA	16
Bicarbonate	--	--	200	221	2 U	54.9	55	320
Biological oxygen demand	--	--	2 U	2 U	0.2 U	3.96	2 U	NA
Chemical oxygen demand	--	--	5 U	5 U	67.3	5 U	5 U	29
Chloride	--	--	15.1	20	16	NA	19	22
Hardness	--	--	NA	NA	342	140	110	569
Methane	--	--	NA	NA	NA	NA	0.0212 U	NA
Nitrate	10	5.8	NA	NA	0.05 U	0.05 U	0.5 U	NA
Nitrate/Nitrite	10	--	0.05 U	0.05 U	NA	NA	NA	0.55 U
Nitrite	1	0.37	NA	NA	0.05 U	0.05 U	0.05 U	NA
pH	--	--	NA	6.7	7.87	8.09	8.1	NA
Oil and Grease	--	--	1 U	1 U	NA	NA	NA	NA
Sulfate	--	--	177	214	248	98.4	54	130
Total dissolved solids (TDS)	--	--	451	535	409	170	150	300
Total organic carbon (TOC)	--	--	1.8	18.9	10 U	100 U	1 U	2
Total recoverable phenolics	--	--	NA	NA	50 U	59.5	0.03 U	0.025 U
Reactivity (MG/L)								
No Detections								

Exceeds one or more criteria

* Screening value listed for lead is action level in groundwater

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated - Interference
J - Reported value is estimated

K - Biased high
L - Biased low
R - Unreliable result
U - Analyte not detected

Site 5 Stormwater
Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	West Virginia Water Quality Standards	5ST-1				
Sample ID		AS05-5ST01P-R01	AS05-5ST01-R01	AS05-5ST01P-R03	AS05-5ST01-R03	AS05-5ST01-R04
Sample Date		05/06/98	05/06/98	01/24/99	01/24/99	12/14/99
Chemical Name						
Volatile Organic Compounds (UG/L)						
Acetone	--	10 UJ	10 UJ	5 U	6.8	5 U
Methylene chloride	--	10 U	10 U	2 U	0.6 J	2 U
Trichloroethene	2.7	10 U	10 U	1 U	1.1	1 U
Total Metals (UG/L)						
Aluminum	750	75.3 B	121 B	943 E	829 E	2,440
Barium	1,000	50.6 J	53.4 J	34.6 B	33.2 B	40.2 B
Calcium	--	95,800	100,000	54,100	52,100	23,300
Copper	--	5.5 U	5.5 U	13.5 B	21.2 B	34.2
Iron	1,500	1,040 J	252 B	1,860	1,820	6,030
Lead	--	23.2 B	1.7 U	1 U	3 B	30.5
Magnesium	--	15,400	16,200	8,160	7,830	3,730 B
Manganese	1,000	15.8 B	12.9 B	57	57.2	157
Potassium	--	2,550 J	2,540 J	1,910 B	1,870 B	1,920 B
Silver	--	3.7 L	2.8 UL	2 U	2 U	1 U
Zinc	50	16 B	13.6 B	31.7	34.2	56.8
Wet Chemistry (MG/L)						
Biological oxygen demand	--	2 U	2 U	0.2 U	2.1	15.9
Chemical oxygen demand	--	NA	NA	5 U	5 U	31
Hardness	--	NA	NA	171	163	72.2
Nitrate	10	NA	NA	0.797	0.894	17.9
Nitrate/Nitrite	--	1.04	1.05	NA	NA	NA
Nitrite	1	NA	NA	0.05 U	0.05 U	0.11
pH	6.0 - 9.0	NA	NA	NA	NA	NA
Oil and Grease	--	1 U	1 U	0.8	0.6	2.6
Total suspended solids (TSS)	--	5 U	5 U	45	96	179

Exceeds one or more criteria

NA - Not analyzed

B - Analyte not detected above associated blank

E - Estimated - Interference

J - Reported value is estimated

L - Reported value may be biased low

U - Analyte not detected

4
Site 5 Sediment Detected Constituents
Allegheny Ballistics Laboratory
Rocket Center, West Virginia

Station ID	RBC-Soil	5SD-1/5SW-1							
Sample ID	Residential	AS05-5SD01-R01	AS05-5SD01-R04	AS05-5SD1-R04	AS05-5SD01-R05	AS05-5SD01-R06	AS05-5SD02-R01	AS05-5SD02P-R01	
Sample Date	Adj X 10	05/08/98	10/28/99	10/28/99	08/03/00	06/20/01	05/08/98	05/08/98	
Chemical Name									
Volatile Organic Compounds (UG/KG)									
Acetone	7,800,000	15 U	33	33	15 U	19 U	17 U	18 U	
Methylene chloride	850,000	15 U	1.8 J	1.8 J	6.7 B	5.2 B	17 U	32	
Semi-volatile Organic Compounds (UG/KG)									
2-Methylnaphthalene	1,600,000	52	500 U	500 U	510 U	620 U	79	NA	
3- and 4-Methylphenol	390,000	NA	500 U	500 U	510 U	620 U	NA	NA	
Benzo(a)anthracene	8,700	63	500 U	500 U	510 U	620 U	85	NA	
Benzo(a)pyrene	870	49	500 U	500 U	510 U	620 U	62	NA	
Benzo(b)fluoranthene	8,700	110	500 U	500 U	510 U	620 U	140	NA	
Caprolactam	39,000,000	NA	NA	NA	NA	71 L	NA	NA	
Chrysene	870,000	100	500 U	500 U	510 U	79 J	150	NA	
Di-n-butylphthalate	7,800,000	440 U	500 U	500 U	100 J	330 J	600 U	NA	
Diethylphthalate	63,000,000	440 U	500 U	500 U	510 U	160 J	600 U	NA	
Fluoranthene	3,100,000	110	500 U	500 U	510 U	170 J	160	NA	
Phenanthrene	2,300,000	140	500 U	500 U	510 U	63 J	250	NA	
Phenol	47,000,000	440 U	500 U	500 U	510 U	64 J	600 U	NA	
Pyrene	2,300,000	88	500 U	500 U	510 U	130 J	140 J	NA	
bis(2-Ethylhexyl)phthalate	460,000	72	500 U	500 U	510 U	620 U	83	NA	
Explosives (UG/KG)									
No Detections									
Total Metals (MG/KG)									
Aluminum	78,000	7,820 J	6,160	6,160	3,990	6,520	13,700 J	NA	
Antimony	31	1.1 L	1.5 U	1.5 U	1.5 U	1.4 U	0.73 UL	NA	
Arsenic	4.3	9.4	9.9	9.9	6.1	10.2	24.1	NA	
Barium	5,500	128 J	57.3 B	57.3 B	70.4	152	149 J	NA	
Beryllium	160	2.2	2	2	1.3 J	1.7 J	2.9	NA	
Calcium	--	4,210 J	1,610	1,610	3,470	4,760	4,780 J	NA	
Chromium	230	15.6	13.7	13.7	7.1	14.7	31	NA	
Cobalt	4,700	44.2	26.8 E	26.8 E	31.7	44.3	28	NA	
Copper	3,100	38.9	45.8	45.8	22.3	30.7	67.5	NA	
Cyanide	1,600	NA	NA	NA	1.7	0.93 U	NA	NA	
Iron	47,000	34,800 J	26,800	26,800	18,600	27,200	47,100 J	NA	
Lead	4,000	36	35 E	35 E	24.3	37.9	43.6	NA	
Magnesium	--	1,240 J	727 B	727 B	797 J	1,130 J	1,040 J	NA	
Manganese	1,600	941 J	342 E	342 E	1,190	1,130	603 J	NA	
Mercury	23	0.07 U	0.2	0.2	0.21 B	0.17 U	0.24 B	NA	
Nickel	1,600	63.7	53.8 E	53.8 E	50	70.6	48.8	NA	
Potassium	--	948 J	677 B	677 B	532 J	849 J	843 J	NA	

NA - Not analyzed

B - Analyte not detected above associated blank

E - Estimated

J - Reported value is estimated

L - Reported value may be biased low

N - Tentative ID, consider present

R - Unreliable result

U - Analyte not detected

Site 5 Sediment Detected Constituents
 Allegany Ballistics Laboratory
 Rocket Center, West Virginia

Station ID	RBC-Soil	5SD-1/5SW-1						
Sample ID	Residential	AS05-5SD01-R01	AS05-5SD01-R04	AS05-5SD1-R04	AS05-5SD01-R05	AS05-5SD01-R06	AS05-5SD02-R01	AS05-5SD02P-R01
Sample Date	Adj X 10	05/08/98	10/28/99	10/28/99	08/03/00	06/20/01	05/08/98	05/08/98
Chemical Name								
Selenium	390	1 U	3.6 N	3.6 N	0.68 U	2.1	1.1 U	NA
Sodium	--	59.1 B	213 B	213 B	299 B	181 U	114 B	NA
Thallium	5.5	0.48 U	2.1 U	2.1 U	3.4 B	2.1 U	1.1 J	NA
Vanadium	550	23.8	15.5	15.5	11.3 J	16.7 J	28	NA
Zinc	23,000	221 J	178 E	178 E	141	203	209 J	NA

Exceeds one or more criteria

NA - Not analyzed
 B - Analyte not detected above associated blank
 E - Estimated
 J - Reported value is estimated
 L - Reported value may be biased low

N - Tentative ID, consider present
 R - Unreliable result
 U - Analyte not detected

4
Site 5 Sediment Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	5SD-2/5SW-2						5SD-3/5SW-3	
Sample ID	AS05-5SD02-R04	AS05-5SD02P-R04	AS05-5SD02-R05	AS05-5SD02P-R05	AS05-5SD02-R06	AS05-5SD02P-R06	AS05-5SD03-R05	AS05-5SD03-R06
Sample Date	10/28/99	10/28/99	08/03/00	08/03/00	06/20/01	06/20/01	08/03/00	06/20/01
Chemical Name								
Volatile Organic Compounds (UG/KG)								
Acetone	25	18 J	23 UJ	21 UJ	17 U	17 U	50 UJ	25 U
Methylene chloride	3.3 J	2.5 J	23 UJ	7.4 B	4.5 B	4.7 B	50 UJ	7.6 B
Semi-volatile Organic Compounds (UG/KG)								
2-Methylnaphthalene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
3- and 4-Methylphenol	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	7,800
Benzo(a)anthracene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
Benzo(a)pyrene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
Benzo(b)fluoranthene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
Caprolactam	NA	NA	NA	NA	570 R	560 R	NA	1,600 R
Chrysene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
Di-n-butylphthalate	630 U	600 U	760 U	120 J	570 U	560 U	260 J	95 J
Diethylphthalate	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
Fluoranthene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
Phenanthrene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
Phenol	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	510 J
Pyrene	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	810 U
bis(2-Ethylhexyl)phthalate	630 U	600 U	760 U	710 U	570 U	560 U	1,700 U	95 J
Explosives (UG/KG)								
No Detections								
Total Metals (MG/KG)								
Aluminum	8,270	8,840	8,290	8,460	10,400	11,700	5,780	11,200
Antimony	1.9 U	1.8 U	2.2 U	2.1 U	1.6 J	1.2 U	4.8 U	1.8 U
Arsenic	15.4	15.1	16.4	12.7	16.3	18.8	9.7 J	16.2
Barium	121	118	117	111	144	146	111 J	208
Beryllium	2.6	2.7	2.3 J	2.2	2.4	2.6	1.8 J	2.6
Calcium	79,500	71,500	64,000	94,100	3,640	3,590	5,890	4,520
Chromium	49.9	50.3	54.3	80.9	23.5	24.7	4.5 J	17.6
Cobalt	39.9 E	40.6 E	46.2	47.9	39.2	36.3	51.9	72.6
Copper	64.7	65.7	60.6	62.8	46.5	50.7	28.9	40.3
Cyanide	NA	NA	1.1 U	1.1 U	0.86 U	0.83 U	2.5 U	1.23 U
Iron	26,400	26,400	22,900	20,700	30,700	33,600	20,500	33,900
Lead	29.5 E	22.2 E	32.3	26.3	32.5	33.8	27.3	37.2
Magnesium	2,600	2,450	2,600	3,620	1,050 J	1,050 J	1,140 J	1,810 J
Manganese	746 E	734 E	1,050	1,020	1,110	892	1,420	1,700
Mercury	1.7	1.6	4.8	1.7	0.17 U	0.17 U	1.4	0.23 U
Nickel	72.3 E	72.6 E	76.4	85.2	64.9	62.9	78	110
Potassium	686 B	771 B	650 J	801 J	953 J	984 J	657 J	1,320 J

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated
J - Reported value is estimated
L - Reported value may be biased low

N - Tentative ID, consider present
R - Unreliable result
U - Analyte not detected

4
Site 5 Sediment Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	5SD-2/5SW-2						5SD-3/5SW-3	
Sample ID	AS05-5SD02-R04	AS05-5SD02P-R04	AS05-5SD02-R05	AS05-5SD02P-R05	AS05-5SD02-R06	AS05-5SD02P-R06	AS05-5SD03-R05	AS05-5SD03-R06
Sample Date	10/28/99	10/28/99	08/03/00	08/03/00	06/20/01	06/20/01	08/03/00	06/20/01
Chemical Name								
Selenium	1.9 U	1.8 N	1 U	1.1 B	1.7 U	1.6 U	2.2 U	2.4 U
Sodium	1,850 B	1,660 B	1,190 J	1,890 J	168 U	161 J	899 B	236 U
Thallium	2.7 U	2.5 U	1 U	0.97 U	2 U	1.9 U	2.3 U	2.7 U
Vanadium	14 B	14.7 B	16.4 J	14.4 J	19.3	20.9	19.4 J	25.1
Zinc	263 E	281 E	299	343	227	236	255	334

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated
J - Reported value is estimated
L - Reported value may be biased low

N - Tentative ID, consider present
R - Unreliable result
U - Analyte not detected

4
Site 5 Sediment Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	5SD-4/5SW-4	
Sample ID	AS05-5SD04-R05	AS05-5SD04-R06
Sample Date	08/03/00	06/20/01
Chemical Name		
Volatile Organic Compounds (UG/KG)		
Acetone	13 U	15 U
Methylene chloride	5 B	4.6 B
Semi-volatile Organic Compounds (UG/KG)		
2-Methylnaphthalene	420 U	510 U
3- and 4-Methylphenol	420 U	63 J
Benzo(a)anthracene	420 U	510 U
Benzo(a)pyrene	420 U	510 U
Benzo(b)fluoranthene	420 U	510 U
Caprolactam	NA	510 R
Chrysene	420 U	510 U
Di-n-butylphthalate	110 J	510 U
Diethylphthalate	420 U	510 U
Fluoranthene	420 U	510 U
Phenanthrene	420 U	510 U
Phenol	420 U	510 U
Pyrene	420 U	510 U
bis(2-Ethylhexyl)phthalate	420 U	510 U
Explosives (UG/KG)		
No Detections		
Total Metals (MG/KG)		
Aluminum	3,520	5,870
Antimony	1.2 U	1.1 U
Arsenic	7.3	10.5
Barium	35.5 J	119
Beryllium	1.3	1.5
Calcium	908 J	2,720
Chromium	7.6	13
Cobalt	29.5	39.3
Copper	16.1	25.4
Cyanide	0.63 U	0.76 U
Iron	22,200	28,100
Lead	18.5	27.7
Magnesium	494 J	896 J
Manganese	237	916
Mercury	0.13 B	0.15 U
Nickel	48.4	60.9
Potassium	400 J	806 J

NA - Not analyzed
B - Analyte not detected above associated blank
E - Estimated
J - Reported value is estimated
L - Reported value may be biased low

N - Tentative ID, consider present
R - Unreliable result
U - Analyte not detected

4
 Site 5 Sediment Collected Constituents
 Allegany Ballistics Laboratory
 Rocket Center, West Virginia

Station ID	5SD-4/5SW-4	
Sample ID	AS05-5SD04-R05	AS05-5SD04-R06
Sample Date	08/03/00	06/20/01
Chemical Name		
Selenium	0.54 U	1.5 U
Sodium	249 B	145 U
Thallium	1.9 B	1.7 U
Vanadium	11.1 J	15.5
Zinc	149	188



NA - Not analyzed
 B - Analyte not detected above associated blank
 E - Estimated
 J - Reported value is estimated
 L - Reported value may be biased low

N - Tentative ID, consider present
 R - Unreliable result
 U - Analyte not detected

Table 5
Site 5 Surface Water Detected Constituents
Allegheny Ballistics Laboratory
Rocket Center, West Virginia

Station ID	5SD-1/5SW-1		5SD-2/5SW-2			
Sample ID	AS05-5SW01-R05	AS05-5SW01-R06	AS05-5SW02-R05	AS05-5SW02P-R05	AS05-5SW02-R06	AS05-5SW02P-R06
Sample Date	08/03/00	06/20/01	08/03/00	08/03/00	06/20/01	06/20/01
Chemical Name						
Volatile Organic Compounds (UG/L)						
No Detections						
Explosives (UG/L)						
No Detections						
Total Metals (UG/L)						
Aluminum	405	171 J	408 B	339 B	204	208
Barium	44.5 B	51.8 J	46 J	45 J	52.6 J	59.4 J
Calcium	53,574	50,700	54,600	54,800	52,100	58,600
Cobalt	2.23 B	1.8 U	2.5 J	1.2 J	1.8 U	1.8 U
Iron	749	281	970	636	308	278
Lead	2 U	3 U	3.2 K	4.8 K	3 U	3 U
Magnesium	12,403	13,400	12,600	12,600	13,800	15,600
Manganese	210	177	221	214	177	198
Mercury	0.12 B	0.2 U	0.1 U	0.1 U	0.39	0.38
Nickel	2.35 B	5.4 J	2 U	4.4 B	5.8 J	6.7 J
Potassium	3,558 B	3,030 J	3,510 J	3,490 J	3,130 J	3,570 J
Sodium	26,807	28,100	26,000 J	26,000 J	28,800	32,700
Zinc	37.5	20.5	30 B	29.6 B	25.6	33.6
Dissolved Metals (UG/L)						
Aluminum	405	93.8 B	NA	NA	75.8 B	76.6 B
Barium	44.5 B	54.8 J	NA	NA	54 J	52.5 J
Beryllium	0.15 B	0.11 J	NA	NA	0.1 U	0.1 U
Calcium	53,574	54,700	NA	NA	53,800	52,500
Chromium	0.7 U	0.6 U	NA	NA	0.6 U	1.7 J
Copper	2.04 B	3.4 B	NA	NA	3.5 B	4 J
Iron	749	15.8 U	NA	NA	44.8 J	61.1 B
Magnesium	12,403	14,400	NA	NA	14,400	14,000
Manganese	210	7.6 B	NA	NA	7.1 B	8.4 B
Potassium	3,558 B	3,640 J	NA	NA	3,520 J	3,420 J
Sodium	26,807	29,900	NA	NA	30,100	29,200
Zinc	37.5	39.9	NA	NA	30.2	36.2
Wet Chemistry (MG/L)						
Hardness	NA	180	NA	NA	190	210

NA - Not analyzed

B - Analyte not detected above associated blank

J - Reported value is estimated

K - Reported value may be biased high

R - Unreliable result

U - Analyte not detected

Table 5
Site 5 Surface Water Detected Constituents
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Station ID	5SD-3/5SW-3		5SD-4/5SW-4	
Sample ID	AS05-5SW03-R05	AS05-5SW03-R06	AS05-5SW04-R05	AS05-5SW04-R06
Sample Date	08/03/00	06/20/01	08/03/00	06/20/01
Chemical Name				
Volatile Organic Compounds (UG/L)				
No Detections				
Explosives (UG/L)				
No Detections				
Total Metals (UG/L)				
Aluminum	419	214	414 B	192 J
Barium	50.4 J	55.8 J	45.6 J	54.8 J
Calcium	60,600	54,000	53,700	54,300
Cobalt	1.7 J	1.8 U	2.4 J	1.8 U
Iron	878	383	801	310
Lead	2.4 K	3 U	3.9 K	3 U
Magnesium	14,000	14,400	12,300	14,500
Manganese	238	229	235	189
Mercury	0.1 U	0.2 U	0.1 U	0.2 U
Nickel	3 B	5.5 J	3.4 B	5.8 J
Potassium	4,010 J	3,180 J	3,530 J	3,280 J
Sodium	29,400 J	29,700	26,300 J	30,500
Zinc	39.4 B	18.2 J	34.7 B	17.8 J
Dissolved Metals (UG/L)				
Aluminum	NA	73.7 B	NA	93.5 B
Barium	NA	51.6 J	NA	52 J
Beryllium	NA	0.1 U	NA	0.1 U
Calcium	NA	52,000	NA	53,800
Chromium	NA	0.69 J	NA	1.4 J
Copper	NA	3.2 B	NA	3.4 B
Iron	NA	28.6 J	NA	21.6 B
Magnesium	NA	13,900	NA	14,400
Manganese	NA	8.2 B	NA	5.9 B
Potassium	NA	3,330 J	NA	3,470 J
Sodium	NA	28,300	NA	29,300
Zinc	NA	27.9	NA	29.6
Wet Chemistry (MG/L)				
Hardness	NA	190	NA	200

NA - Not analyzed

B - Analyte not detected above associated blank

J - Reported value is estimated

K - Reported value may be biased high

R - Unreliable result

U - Analyte not detected

Appendix 7
Site Inspection Photographic Log



Photograph No.: 1
Date: October 16, 2001

Direction: W

Description: Site 5 Landfill Cap showing the locations of two of the landfill perimeter access restriction signs. Note the segment of the perimeter rip-rap surface-water drainage channel in the foreground.



Photograph No.: 2
Date: October 16, 2001

Description: Close-up of a Site 5 landfill access restriction sign.



Photograph No.: 3
Date: October 16, 2001

Direction: NW

Description: Site 5 landfill cap from adjacent embankment. Note the perimeter drainage channel and landfill gas monitoring well 5LGMW01 in the foreground.



Photograph No.: 4
Date: October 16, 2001

Direction: SW

Description: Western edge of Site 5 landfill cap. Note perimeter drainage channel and several groundwater monitoring wells.



Photograph No.: 5

Date: October 16, 2001

Description: Close-up of the stormwater runoff autosampler at the perimeter drainage channel outfall to the North Branch Potomac River.



Photograph No.: 6

Date: October 16, 2001

Direction: SW

Description: General condition of the Site 5 landfill cap. Note the landfill gas vents in the background and foreground.



Photograph No.: 7

Direction: SW

Date: October 16, 2001

Description: General view showing eastern edge of the Site 5 landfill, a portion of the perimeter drainage channel, landfill gas monitoring well 5LGMW01, and the adjacent embankment.



Photograph No.: 8

Direction: NE

Date: October 16, 2001

Description: Close-up of the area of slope creep on embankment adjacent to east side of landfill.



Photograph No.: 9
Date: October 16, 2001

Direction: S

Description: General view showing western edge of the Site 5 landfill.



Photograph No.: 10
Date: October 16, 2001

Direction: SW to SE

Description: General view of the southern edge of the Site 5 landfill. Note several groundwater monitoring wells.

Appendix 8
5-Year-Review Site Inspection Checklist(s)

Five-Year Review Site Inspection Checklist

Purpose of the Checklist

The site inspection checklist provides a useful method for collecting important information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information should be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

- I. Site Information
- II. Interviews
- III. On-site Documents & Records Verified
- IV. O&M Costs
- V. Access and Institutional Controls
- VI. General Site Conditions
- VII. Landfill Covers
- VIII. Vertical Barrier Walls
- IX. Groundwater/Surface Water Remedies
- X. Other Remedies
- XI. Overall Observations

Some data and information identified in the checklist may or may not be available at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept on site or may be kept in the offices of the contractor or at State offices. In cases where the information is not kept at the site, the item should not be checked as "not applicable," but rather it should be obtained from the office or agency where it is maintained. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA and the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treat remedies. Sections of the checklist are also provided for some other remedies. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified to suit your needs when inspecting other types of remedies, as appropriate.

The checklist may be completed and attached to the Five-Year Review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX of the checklist). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note site conditions, write comments on the facilities, and attach any additional pertinent information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs may be early indicators of remedy problems. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs incurred are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and utilities which can include electricity, telephone, natural gas, water, and fuel. Auxiliary materials include other expendable materials such as chemicals used during plant operations.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

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Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: <u>ABL, SITE 5, DU1</u>	Date of inspection: <u>10/16/01</u>
Location and Region: <u>MINERAL Cty. West VA</u>	EPA ID: <u>WV0170023691</u>
Agency, office, or company leading the five-year review: <u>USEPA REGION III, WVDEP</u>	Weather/temperature: <u>59°F / OVERCAST</u>
Remedy Includes: (Check all that apply) <input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls Groundwater pump and treatment Surface water collection and treatment Other _____ Monitored natural attenuation Groundwater containment Vertical barrier walls	
Attachments: Inspection team roster attached <u>listed below</u> Site map attached <u>→ IN ROD REVIEW Rpt</u>	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager <u>JOE KENDERDINE</u> <u>PROJ. MANAGER</u> <u>10/16/01</u> Name Title Date Interviewed at site at office <input checked="" type="checkbox"/> by phone Phone no. <u>703-471-1441</u> Problems, suggestions; Report attached <u>NONE</u>	
2. O&M staff <u>TIM MILLER</u> <u>OPERATIONS MANAGER</u> <u>10/16/01</u> Name Title Date Interviewed at site at office <input checked="" type="checkbox"/> by phone Phone no. <u>304-726-4219</u> Problems, suggestions; Report attached <u>NONE</u> COMMENT: <u>SEVERAL DEAD TREES ON NW SIDE OF LANDFILL. SUSPECTED CAUSE IS CHANGE IN DRAINAGE DUE TO REMEDIAL ACTION.</u>	

INSPECTION TEAM ROSTER:

DOMINIC O'CONNOR / NAVSTDIV
 BRUCE BEACH / USEPA
 TOM BASS / WVDEP
 JOHN AUBERT / NAVSEA D-7
 BRETT DOERR / CH2M HILL
 STEVE GLENNIE / CH2M HILL

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	O&M Documents O&M manual ✓ As-built drawings ✓ Maintenance logs ✓ Remarks <u>Also located in R00</u> <u>And DEED Notification at Site 1 Treatment Plant.</u>	<u>Readily available</u> <u>Readily available</u> <u>Readily available</u>	<u>Up to date</u> <u>Up to date</u> <u>Up to date</u>	N/A N/A N/A
2.	Site-Specific Health and Safety Plan Contingency plan/emergency response plan Remarks <u>Located at Site 1 Treatment Plant.</u>	<u>Readily available</u> <u>Readily available</u>	<u>Up to date</u> <u>Up to date</u>	N/A N/A
3.	O&M and OSHA Training Records Remarks <u>HAZWOPER OSHA TRAINING.</u>	<u>Readily available</u>	<u>Up to date</u>	N/A
4.	Permits and Service Agreements Air discharge permit Effluent discharge Waste disposal, POTW Other permits Remarks	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	N/A N/A N/A N/A
5.	Gas Generation Records Remarks <u>QUARTERLY MONITORING LOGS</u>	<u>Readily available</u>	<u>Up to date</u>	N/A
6.	Settlement Monument Records Remarks	Readily available	Up to date	<u>N/A</u>
7.	Groundwater Monitoring Records Remarks	<u>Readily available</u>	<u>Up to date</u>	N/A
8.	Leachate Extraction Records Remarks	Readily available	Up to date	<u>N/A</u>
9.	Discharge Compliance Records Air Water (effluent) Remarks <u>AIR - QUARTERLY MONITORING LOGS</u> <u>SURFACE WATER & GROUNDWATER DATA 1998 - PRESENT</u>	<u>Readily available</u> <u>Readily available</u>	<u>Up to date</u> <u>Up to date</u>	N/A N/A
10.	Daily Access/Security Logs Remarks <u>ATK CONTROL ACCESS.</u> <u>TIM MILLER KEEPS TRACK OF HIS ACTIVITIES at SITE 5.</u>	<u>Readily available</u>	<u>Up to date</u>	N/A

IV. O&M COSTS

1. O&M Organization

State in-house
PRP in-house
Federal Facility in-house
Other _____

Contractor for State
Contractor for PRP
Contractor for Federal Facility

2. O&M Cost Records

Readily available Up to date
Funding mechanism/agreement in place
Original O&M cost estimate _____ Breakdown attached

Total annual cost by year for review period if available

From <u>1/97</u>	To <u>12/97</u>	<u>\$1,100</u>	Breakdown attached
Date	Date	Total cost	
From <u>1/98</u>	To <u>12/98</u>	<u>\$73,000</u>	Breakdown attached
Date	Date	Total cost	
From <u>1/99</u>	To <u>12/99</u>	<u>\$64,000</u>	Breakdown attached
Date	Date	Total cost	
From <u>1/2000</u>	To <u>12/2000</u>	<u>\$69,500</u>	Breakdown attached
Date	Date	Total cost	
From <u>1/2001</u>	To <u>12/2001</u>	<u>\$74,000</u>	Breakdown attached
Date	Date	Total cost	

3. Unanticipated or Unusually High O&M Costs During Review Period

Describe costs and reasons:

UNANTICIPATED: • AUTO SAMPLERS INSTALLED TO COLLECT
WATER DISCHARGE
• METHANE GAS STUDY COSTS
• SLUMP STUDY COSTS

V. ACCESS AND INSTITUTIONAL CONTROLS Applicable N/A

A. Fencing

1. Fencing damaged Location shown on site map Gates secured N/A
Remarks FENCING ALONG RIVER - BARBED WIRE
ALL OTHER DIRECTIONS SECURED BY ATK

B. Other Access Restrictions

1. Signs and other security measures Location shown on site map N/A
Remarks SEE P&O REVIEW REPORT FOR LOCATION DESCRIPTIONS.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
- Site conditions imply ICs not properly implemented Yes ☒ No N/A
- Site conditions imply ICs not being fully enforced Yes ☒ No N/A
- Type of monitoring (e.g., self-reporting, drive by) SITE INSPECTION
- Frequency Monthly
- Responsible party/agency 304-
- Contact Tim Miller Operations Manager 10/16/02 726-4619
- Name Title Date Phone no.
- Reporting is up-to-date ☒ Yes No N/A
- Reports are verified by the lead agency Yes No N/A
- Specific requirements in deed or decision documents have been met Yes No N/A
- Violations have been reported Yes No N/A
- Other problems or suggestions: Report attached

2. **Adequacy** ICs are adequate ICs are inadequate N/A
- Remarks

D. General

1. **Vandalism/trespassing** Location shown on site map No vandalism evident
- Remarks

2. **Land use changes on site** N/A
- Remarks

3. **Land use changes off site** N/A
- Remarks

VI. GENERAL SITE CONDITIONS

- A. Roads** Applicable N/A

1. **Roads damaged** Location shown on site map Roads adequate N/A
- Remarks

B. Other Site ConditionsRemarks _____

_____**VII. LANDFILL COVERS**Applicable N/A**A. Landfill Surface**

- | | | | |
|----|--|---|---------------------------|
| 1. | Settlement (Low spots)
Areal extent _____
Remarks <u>NONE</u> | Location shown on site map
Depth _____ | Settlement not evident |
| 2. | Cracks
Lengths _____
Remarks <u>NONE</u> | Widths _____
Depths _____ | Cracking not evident |
| 3. | Erosion
Areal extent _____
Remarks <u>MINIMAL AMOUNT OF EROSION NOTED. DISPERSED.</u> | Location shown on site map
Depth _____ | Erosion not evident |
| 4. | Holes
Areal extent _____
Remarks <u>NONE</u> | Location shown on site map
Depth _____ | Holes not evident |
| 5. | Vegetative Cover
Trees/Shrubs (indicate size and locations on a diagram)
Remarks _____ | <u>Grass</u>
<u>Cover properly established</u> | No signs of stress |
| 6. | Alternative Cover (armored rock, concrete, etc.)
Remarks _____ | <u>N/A</u> | |
| 7. | Bulges
Areal extent _____
Remarks _____ | Location shown on site map
Height _____ | <u>Bulges not evident</u> |

8.	Wet Areas/Water Damage	<u>Wet areas/water damage not evident</u>	
	Wet areas	Location shown on site map	Areal extent _____
	Ponding	Location shown on site map	Areal extent _____
	Seeps	Location shown on site map	Areal extent _____
	Soft subgrade	Location shown on site map	Areal extent _____
	Remarks _____		
9.	Slope Instability	Slides	Location shown on site map
	Areal extent _____	<u>SLUMP</u>	No evidence of slope instability
	Remarks <u>NONE ON LANDFILL. SLUMPING NOTED EAST OF LANDFILL -</u>		
	<u>OFF CAP</u>		
B.	Benches	Applicable	<u>N/A</u>
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	Flows Bypass Bench	Location shown on site map	N/A or okay
	Remarks _____		
2.	Bench Breached	Location shown on site map	N/A or okay
	Remarks _____		
3.	Bench Overtopped	Location shown on site map	N/A or okay
	Remarks _____		
C.	Letdown Channels	Applicable	<u>N/A</u>
	(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	Settlement	Location shown on site map	No evidence of settlement
	Areal extent _____	Depth _____	
	Remarks _____		
2.	Material Degradation	Location shown on site map	No evidence of degradation
	Material type _____	Areal extent _____	
	Remarks _____		
3.	Erosion	Location shown on site map	No evidence of erosion
	Areal extent _____	Depth _____	
	Remarks _____		

4.	Undercutting Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	No evidence of undercutting
5.	Obstructions Type _____ Location shown on site map _____ Size _____ Remarks _____	Areal extent _____	No obstructions
6.	Excessive Vegetative Growth No evidence of excessive growth Vegetation in channels does not obstruct flow Location shown on site map _____ Remarks _____	Type _____ Areal extent _____	
D. Cover Penetrations <u>Applicable</u> N/A			
1.	Gas Vents <u>Properly secured/locked</u> Evidence of leakage at penetration N/A Remarks _____	<u>Active</u> <u>Functioning</u>	<u>Passive</u> <u>Routinely sampled</u> Needs Maintenance <u>Good condition</u>
2.	Gas Monitoring Probes <u>Properly secured/locked</u> Evidence of leakage at penetration Remarks _____	<u>Functioning</u>	<u>Routinely sampled</u> Needs Maintenance <u>Good condition</u> <u>N/A</u>
3.	Monitoring Wells (within surface area of landfill) <u>Properly secured/locked</u> Evidence of leakage at penetration Remarks _____	<u>Functioning</u>	<u>Routinely sampled</u> Needs Maintenance <u>Good condition</u> <u>N/A</u>
4.	Leachate Extraction Wells <u>Properly secured/locked</u> Evidence of leakage at penetration Remarks _____	<u>Functioning</u>	<u>Routinely sampled</u> Needs Maintenance <u>Good condition</u> <u>N/A</u>
5.	Settlement Monuments Remarks _____	<u>Located</u>	<u>Routinely surveyed</u> <u>N/A</u>

E. Gas Collection and Treatment		Applicable	N/A
1.	Gas Treatment Facilities Flaring Good condition Remarks _____	Thermal destruction Needs Maintenance	Collection for reuse
2.	Gas Collection Wells, Manifolds and Piping Good condition Remarks _____	Needs Maintenance	
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings) Good condition Remarks _____	Needs Maintenance	N/A
F. Cover Drainage Layer		Applicable	N/A
1.	Outlet Pipes Inspected Remarks _____	Functioning	N/A
2.	Outlet Rock Inspected Remarks _____	Functioning	N/A
G. Detention/Sedimentation Ponds		Applicable	N/A
1.	Siltation Areal extent _____ Depth _____ Siltation not evident Remarks _____		N/A
2.	Erosion Areal extent _____ Depth _____ Erosion not evident Remarks _____		
3.	Outlet Works Remarks _____	Functioning	N/A
4.	Dam Remarks _____	Functioning	N/A

H. Retaining Walls		Applicable	N/A
1.	Deformations Horizontal displacement _____ Rotational displacement _____ Remarks _____	Location shown on site map _____ Vertical displacement _____	Deformation not evident
2.	Degradation Remarks _____	Location shown on site map _____	Degradation not evident
I. Perimeter Ditches/Off-Site Discharge		Applicable	N/A
1.	Siltation Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	Siltation not evident
2.	Vegetative Growth Vegetation does not impede flow Areal extent _____ Remarks _____	Location shown on site map _____ Type _____	N/A
3.	Erosion Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	Erosion not evident
4.	Discharge Structure Remarks _____	Functioning _____	N/A
VIII. VERTICAL BARRIER WALLS		Applicable	N/A
1.	Settlement Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	Settlement not evident
2.	Performance Monitoring Type of monitoring _____ Performance not monitored Frequency _____ Head differential _____ Remarks _____		Evidence of breaching

IX. GROUNDWATER/SURFACE WATER REMEDIES		Applicable	N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		Applicable	N/A
1.	Pumps, Wellhead Plumbing, and Electrical Good condition All required wells properly operating Needs Maintenance N/A Remarks _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances Good condition Needs Maintenance Remarks _____ _____		
3.	Spare Parts and Equipment Readily available Good condition Requires upgrade Needs to be provided Remarks _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		Applicable	N/A
1.	Collection Structures, Pumps, and Electrical Good condition Needs Maintenance Remarks _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances Good condition Needs Maintenance Remarks _____ _____		
3.	Spare Parts and Equipment Readily available Good condition Requires upgrade Needs to be provided Remarks _____ _____		

C. Treatment System		Applicable	N/A
1.	Treatment Train (Check components that apply) Metals removal _____ Oil/water separation _____ Bioremediation _____ Air stripping _____ Carbon adsorbers _____ Filters _____ Additive (e.g., chelation agent, flocculent) _____ Others _____ Good condition _____ Needs Maintenance _____ Sampling ports properly marked and functional _____ Sampling/maintenance log displayed and up to date _____ Equipment properly identified _____ Quantity of groundwater treated annually _____ Quantity of surface water treated annually _____ Remarks _____		
2.	Electrical Enclosures and Panels (properly rated and functional) N/A _____ Good condition _____ Needs Maintenance _____ Remarks _____		
3.	Tanks, Vaults, Storage Vessels N/A _____ Good condition _____ Proper secondary containment _____ Needs Maintenance _____ Remarks _____		
4.	Discharge Structure and Appurtenances N/A _____ Good condition _____ Needs Maintenance _____ Remarks _____		
5.	Treatment Building(s) N/A _____ Good condition (esp. roof and doorways) _____ Needs repair _____ Chemicals and equipment properly stored _____ Remarks _____		
6.	Monitoring Wells (pump and treatment remedy) Properly secured/locked _____ Functioning _____ Routinely sampled _____ Good condition _____ All required wells located _____ Needs Maintenance _____ N/A _____ Remarks _____		
D. Monitoring Data			
1.	Monitoring Data Is routinely submitted on time _____ Is of acceptable quality _____		
2.	Monitoring data suggests: Groundwater plume is effectively contained _____ Contaminant concentrations are declining _____		

D. Monitored Natural Attenuation**1. Monitoring Wells (natural attenuation remedy)**

Properly secured/locked	Functioning	Routinely sampled	Good condition
All required wells located	Needs Maintenance		N/A

Remarks _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS**A. Implementation of the Remedy**

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

LANDFILL INSPECTION MEMO'S ARE INCLUDED
IN SEPERATE APPENDIX OF ROD REVIEW REPORT

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Possibly SWITCH SITE INSPECTIONS from
Monthly to QUARTERLY

Appendix 9
February 13, 2002, Public Meeting Transcript

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MEETING

* * * * *

SITE 5

FIVE YEAR RECORD OF DISCUSSION REVIEW

* * * * *

WEDNESDAY, FEBRUARY 13, 2002

6:10 p.m. to 6:22 p.m.

Held at:

Allegany Ballistics Laboratory

Building 300 Conference Room

210 State Route 956

Rocket Center, West Virginia

* * * * *



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1 IN ATTENDANCE:

2 Bruce Beach, USEPA

3 Tom Bass, WVDEP

4 Dominic O'Connor, LANTDIV

5 Lou Williams, LANTDIV

6 John Peters, LANTDIV

7 Dave McBride, LANTDIV

8 John Aubert, NAVSEA

9 John Waugaman, ATK

10 Steve Hawk, ATK

11 Brett Doerr, CH2M HILL

12 Steve Glennie, CH2M HILL

13 Hugh J. Felton, Community Member

14 James Habersack, Community Member

15 Ken Schulze, Community Member

16 Louis Berstien, Community Member

17 Ron Hawk, Community Member

18 Elayne Warren, Community Member

19

20

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P-R-O-C-E-E-D-I-N-G-S

(6:10 p.m.)

MR. DOERR: If we can get started again. The second public meeting we want to have today is to talk about the Site 5 five-year ROD review. Let me explain a little bit about what that is.

The regulations require that when you implement a remedy -- the remedy is documented in the Record of Decision which we call the ROD -- that you have to evaluate your remedy every five years to make sure that you are achieving your objectives.

So the first Record of Decision that was implemented for ABL was a Record of Decision for the Site 5 landfill. Remember that was the cap that was installed on the landfill back in 1997?

Well, it was installed in 1997 and here it is 2002, so it is time to do the five-year ROD review. That will be what we

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1 discuss today. Here is the general outline of
2 the topics: A brief introduction, which I have
3 pretty much have done; we will talk about the
4 remedial action that is in place at Site 5; how
5 the community is involved in this five-year ROD
6 review process; during the course of our
7 evaluation of the remedy, any issues that we
8 identified and how we recommend to take care of
9 those issues; and then our conclusions of the
10 five-year review.

11 As I stated before, this is the first
12 five-year ROD review we have had to do for ABL,
13 because of the Site 5 landfill cap Record of
14 Decision was the first ROD. That is the --
15 mobilized from the site to start putting that
16 landfill cap on in July 7, 1997. We have until
17 July 7, 2002, to submit our five-year review
18 report.

19 As I said, the purpose of it is to
20 make sure we are still meeting our objectives.
21 In this case, to make sure that landfill cap is

1 still protective of human health and the
2 environment.

3 The groundwater at Site 5 is still
4 under investigation. That will be the subject of
5 a different Record of Decision. Site 5 Record of
6 Decision that we are concerned with today is the
7 Record of Decision for the landfill cap and the
8 soil.

9 Again, for any remedy, you have
10 objectives; what the remedy is supposed to
11 achieve. Here are the objectives for the
12 landfill cap: Prevent or minimize direct contact
13 with people, plants and animals with landfill
14 contents and the soil; prevent or minimize any
15 contamination in the landfill from percolating
16 down into the groundwater. Basically you want to
17 prevent precipitation from infiltrating the
18 landfill and picking up contamination and
19 carrying it down further into the groundwater;
20 and you want to prevent that landfill cap from
21 eroding, so we want to prevent water from getting

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1 on top of the landfill and carrying away the soil
2 sitting on top of the cap.

3 The way we achieve those objectives?
4 Obviously, the biggest one was when we installed
5 that cap, (Inaudible) liner and the cap. We
6 revegetated the area. We put administrative
7 controls on the area, security gates, signs up
8 warning of trespassing and so forth. We have a
9 landfill gas collection system. Any methane gas
10 that is being generated under the landfill cap is
11 collected and comes out the vents. We do not
12 only do groundwater sediment monitoring adjacent
13 to the landfill, but we also do gas monitoring.

14 The groundwater sediment monitoring is
15 done because one of the hopes was that by putting
16 this landfill cap on, that we would stop the
17 infiltration of the precipitation picking up the
18 contamination and carrying it into the
19 groundwater and that groundwater moving out
20 toward the river.

21 If we stop that, maybe the groundwater

1 concentrations would decline on their own.
2 That's why we continue to do groundwater
3 monitoring -- the sediment of the river to be
4 monitored.

5 This is sort of a chronology of when
6 the remedy was implemented. It was designed in
7 March 1997. We began construction on July 7,
8 1997, and the cap was completed October 2, 1997.

9 Concurrently, an operation and
10 maintenance program was put into place to make
11 sure that the landfill cap was maintained in such
12 a way as to minimize or prevent its degradation;
13 keep the grass mowed on it, you don't let people
14 drive on it, and a number of other preventative
15 measure.

16 Every month, we have an inspector that
17 goes out there to make sure there are no
18 abnormalities; all the groundwater monitoring
19 wells and our gas monitoring wells and our gas
20 vents are all in good condition; fencing, warning
21 signs and anything like that is in good

1 condition; the drainage channels that encircle
2 the landfill that carry that surface water away
3 and prevent it from eroding on the landfill cap,
4 make sure those drainage channels are free of
5 obstructions. That's done on a monthly basis.

6 On a quarterly basis, we do an even
7 more detailed inspection. That detailed
8 inspection is when we measure our gas
9 concentrations in our landfill gas monitoring
10 wells and our vents. The difference between the
11 gas monitoring wells and the vents are the vents
12 are sitting right on top of the landfill. They
13 are going right through the cap. So any methane
14 gas that is being generated in the landfill will
15 come out through those vents.

16 You ring the landfill with gas
17 monitoring wells. In case any gas decides it's
18 going to go a different way than it's supposed
19 to, like sneak out the side, that well is out
20 there to monitor for that.

21 This is a slide that talks about the

1 community involvement in the five-year Record of
2 Decision review. During our October 2001 RAD
3 meeting, Dominic O'Connor presented the reason we
4 were doing the five-year ROD review. The fact
5 that we started the review, what were going to be
6 the components of the review, and that how we
7 would disseminate this information back to the
8 community.

9 Part of the purpose of this public
10 meeting today is to tell you what our findings
11 were. We've completed the evaluation of the
12 landfill cap, the remedy for Site 5 landfill.
13 When we present that information to you, once we
14 get your feedback on our findings, we will
15 finalize that report. Again, it will go into the
16 Administrative Record for ABL, which are at these
17 two libraries we were talking about before.

18 What we found is that the landfill cap
19 is meeting the objectives. The landfill cap is
20 in good condition. Those things that were
21 established as its objectives are being met.

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1 There are several minor issues that we have found
2 when we did the inspection of the landfill
3 records and so forth. I'll go over each one of
4 those issues of what we found and then what our
5 recommended remedy is to address those issues.

6 We want to implement more land use
7 controls; additional signs, fencing and so forth
8 at the landfill. More of an administrative
9 control to make sure that any construction work
10 that is going to be done at ABL, the people that
11 are overseeing construction work, make sure they
12 know where they can and cannot go at Site 5.
13 Make sure that the landfill cap remains
14 protected.

15 The way we will address that is we
16 will finalize what we call our Land Use
17 Implementation Plan. That, basically, tells you
18 how you can use your land. That document will be
19 available at ABL so where land use is under
20 control, and the landfill cap is one of those,
21 controlling how that land can be used. That that

1 is known to anybody that can potentially be in
2 that area.

3 The second issue we found is that the
4 landfill -- we talked about the landfill before.
5 The landfill is right up against the side of the
6 mountain. There is a very steep slope that comes
7 down into the landfill. That was somewhat
8 regraded when that landfill was capped.

9 What we find is that there is a
10 slope -- on the uphill side of that landfill,
11 there is a little bit of slope. The slope is
12 starting to slump a little bit. There is a crack
13 that's formed, and it's offset maybe less than a
14 foot, I think. But the land is starting slump
15 down somewhat. That's simply because of the
16 stability of the slope. It's a very high-angled
17 slope. The slope wants to get itself to a lower
18 angle, so it's slumping down somewhat.

19 If it's moving slowly, it's moving
20 very, very slowly. If it happened quickly, it
21 could have offset very quickly and we noticed it,

1 or it is moving very, very slowly. It is moving
2 slowly. It's a very slow creep, so we have
3 assessed any potential damage that it could cause
4 if it did slump all the way and pour out over the
5 landfill.

6 What we have decided is that it would
7 be very costly to change the slope of the slope
8 of the hillside below the landfill versus what we
9 would have to do if it just went ahead and
10 slipped. If it slips, it is not going to hurt
11 the landfill cap, it's not going to hurt the
12 drainage channel, it's just going to pour soil on
13 top of our landfill cap and our drainage channels
14 and we will just clean it out. We will address
15 any slope stability at that point.

16 So we are going to continue monitoring
17 and watch and see if it is continuing to creep
18 and then decide whether we want to implement
19 anything into this. We will get data back from
20 the monitoring.

21 We talked about the monthly

1 inspections. If the operator sees any
2 abnormalities or anything that should be
3 addressed, he makes note of it in the monthly
4 report, and then those abnormalities are
5 correction. The correction is also noted. Once
6 a correction is made, the landfill operator will
7 then, on a subsequent monthly visit, will
8 document that the corrective action has been
9 taken.

10 What we have decided is that it is
11 probably a good idea to keep a record just of
12 corrective actions taken at the landfill over the
13 years so that somebody doesn't have to search
14 back through all the monthly reports to try to
15 find anything that was identified and corrected.
16 We are just going to compile this into one report
17 that can show, over time, all the corrective
18 actions that were taken at the landfill to keep
19 the landfill cap in the condition that it needs
20 to be kept in.

21 The long-term monitoring they are

1 doing -- the groundwater sampling and sediment
2 sampling and so forth -- that was all established
3 in a long-term monitoring work plan that was
4 written in, I think, 1997, when the landfill cap
5 was installed. It said how we are going to
6 monitor groundwater, sediment, and so forth.
7 We've collected data over the years, and a number
8 of things have changed. We've better identified
9 the extent of our groundwater plume. We have
10 added some additional wells. We have added some
11 additional sediment sampling locations. Time has
12 gone by, and it's time to update those plans so
13 that they reflect what we are currently doing.
14 We are going to, some time during the course of
15 this year, revise those O&M plans.

16 I also talked about how, on the
17 quarterly inspections, we measure the gas, which
18 is generally methane coming out of our vents and
19 entering our gas monitoring wells around the
20 perimeter of the landfill. What we have noticed
21 over time -- I think it was since December of

1 2000 -- that we have elevated levels of methane
2 in one of our gas monitoring wells. It's higher
3 than the rest of the wells. It seems to have
4 been slowly rising over time.

5 It has, over the course of the last
6 year, continued to rise. So what we decided to
7 do is -- there is no danger with respect to what
8 the concentrations are now. There is no danger
9 of explosion. There is no risk to human health.
10 But what we want to do is before it would ever
11 reach that point, we want to see how much methane
12 is down there and can we extract it out fairly
13 easily.

14 In the next few months, we are going
15 to conduct what we are calling a Pilot Study
16 where we are going to out there and suck the
17 methane gas out of that gas monitoring well over
18 the course of about a week, unless we suck it out
19 right away. We don't know how much methane is
20 there. We will start pulling the methane out.
21 We will monitor the methane gas concentration as

1 it comes out.

2 If we pull it all out right away, we
3 will stop the test, but we are assuming that we
4 are going to pump for about a week and see how
5 much methane we draw out of that well. That will
6 tell us two things: One, how much methane is
7 there. Do we have a small pocket? Big pocket?
8 How much is there. It will also tell us if this
9 periodic gas extraction will it take care of the
10 elevated level and be a remedy in and of itself.

11 To conclude, this five-year review has
12 shown us that the landfill cap is meeting the
13 objectives of the Record of Decision. That is,
14 it is preventing direct contact by people, plants
15 and animals with the waste below the landfill
16 cap. We are reducing the amount of water that
17 goes through that cap. It's being channeled off
18 into the channels and then taken to the river.
19 It is not percolating through our landfill cap,
20 which then helps to protect the groundwater below
21 by not continuing to dissolve the contamination

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1 in the landfill material and carrying it into the
2 groundwater below. We continue to monitor the
3 groundwater to evaluate trends. Are we seeing a
4 downward trend in groundwater contamination
5 concentrations because the cap has prevented
6 additional contamination from getting in.

7 That's about it. That was much
8 shorter. That's it, in a nutshell. That's the
9 five-year evaluation of the landfill cap.

10 Again, I will answer any questions or
11 listen to comments.

12 MS. WARREN: If you find you've got a
13 lot of methane, what are you going to do with it?
14 Try to burn it, or --

15 MR. DOERR: We don't know the plan
16 yet. We don't know enough information yet to
17 know what will be necessary to reduce the methane
18 concentration. As it is, the concentrations
19 itself are not an issue. We could leave them
20 alone as they are since it's not an issue. What
21 we want to do is make an evaluation of the

1 ability to extract that methane, as well as
2 evaluate maybe how much is down there before it
3 will become an issue so we can evaluate the
4 alternatives we have to reduce the levels if we
5 needed to.

6 Sir?

7 MR. HAWK: On that slumping, is there
8 a source of water maybe above that maybe in
9 shallow soil that is allowing the bed of rock
10 there that is causing that, perhaps?

11 MR. DOERR: Certainly, you are
12 thinking about the possibility of water aiding
13 this is a good idea. Yes. Water comes flowing
14 down that slope. If it has found its way into a
15 crack in the soil or something, then it could be,
16 essentially, lubricating that slope which would
17 allow it to slip.

18 MS. WARREN: Are you going to put a
19 (Inaudible) drain in as part of it instead of
20 just regrading the whole thing as a diversion at
21 the top of the slope?

1 MR. DOERR: Well, right now we are not
2 planning on doing any corrective measures
3 because, as is, we haven't visually seen any
4 creep over time. We don't have the measuring
5 devices to measure the creep. That's one of the
6 things we are going to implement this year, but
7 we go out there periodically and look at it. It
8 looks about the same as what it has been. There
9 is a possibility that it's not moving at all.
10 That when it was first constructed that way, it
11 slipped a little bit right away, and then it
12 hasn't done any since because it got itself to a
13 slope that it's comfortable with.

14 Right now, we aren't planning on any
15 corrective measures. We've also evaluated the
16 worst-case scenario, and that is it slips all the
17 way and comes down. Even so, it's not going to
18 do any damage. It's going to make a mess and we
19 will have to clean it up, but it's not going to
20 do any damage.

21 MR. HAWK: The long-range plan, is

1 that completing with grass and keeping that mowed
2 forever?

3 MR. DOERR: The landfill cap? Yeah.
4 It doesn't really require a whole lot of mowing.
5 During dry years, we have only had to mow it
6 about once a year. I think last year we might
7 have mowed it twice, but it's a very minimal
8 effort to keep the landfill mowed.

9 MR. FELTON: Where is Site 5 landfill?

10 MR. DOERR: Do you know where Plant 2
11 is?

12 MR. FELTON: Plant 2? Yes, sir.

13 MR. DOERR: Okay. Site 5 is sitting
14 right next to Plant 2. Going away from State
15 Route 956.

16 MR. HAWK: Any thoughts why you are
17 getting an excess amount of methane in that one
18 well?

19 MR. DOERR: No. It's odd. Based on
20 the historical records of what material has been
21 disposed of in the landfill, it didn't seem to be

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1 anything that was going to be a methane source.

2 One possible answer is that when the
3 landfill cap was constructed, there was a lot of
4 regrading that had to be done around the area;
5 some trees had to be taken down and so forth. It
6 is possible that some of the trees were buried in
7 the regrading of the land around it and that
8 that's the source. We just don't know.

9 The other possibility is that there
10 was something in the landfill that is generating
11 methane gas and, for some reason, it is not
12 getting up into the collection vents, but instead
13 it has found a way around and under. Hard to
14 tell what the possible source is.

15 AUDIENCE PARTICIPANT: Didn't you have
16 construction inspectors on site so you would know
17 whether or not you were burying trees?

18 MR. DOERR: I can't really answer that
19 question. I also don't know if that was -- I
20 guess you shouldn't think about burying a forest.
21 It's more of what if a stump was incorporated in

1 this regrading the slope and our well is sitting
2 right next to the stump that is deteriorating.
3 It really could be a small generator of methane.

4 PANEL MEMBER: I would like to answer
5 that. There were construction inspectors. The
6 EPA also had to go up there maybe every third
7 week during the constitution to monitor the
8 phases of construction. There were people saying
9 that you have a very small stump or you have just
10 a portion of a tree that got incorporated. You
11 would never see that.

12 MR. DOERR: It wasn't a practice of
13 taking the trees down and burying them. But when
14 you are taking some trees down and resloping, you
15 may get some material incorporated into the
16 slope.

17 Anything else? Thank you.

18 MR. WILLIAMS: That concludes the
19 public meeting portion of the review.

20 (Meeting concluded at 6:22 p.m.)

21

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2 I, Monique Christiansen, do hereby
3 certify that the foregoing was taken by me
4 stenographically at the time and place mentioned
5 on the cover sheet hereof and thereafter
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8 Monique Christiansen
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